SPECIAL SERIES: AMIGA MUSIC—p.45

WIN! An Amiga 1200 GAMES CONTEST —see p.41

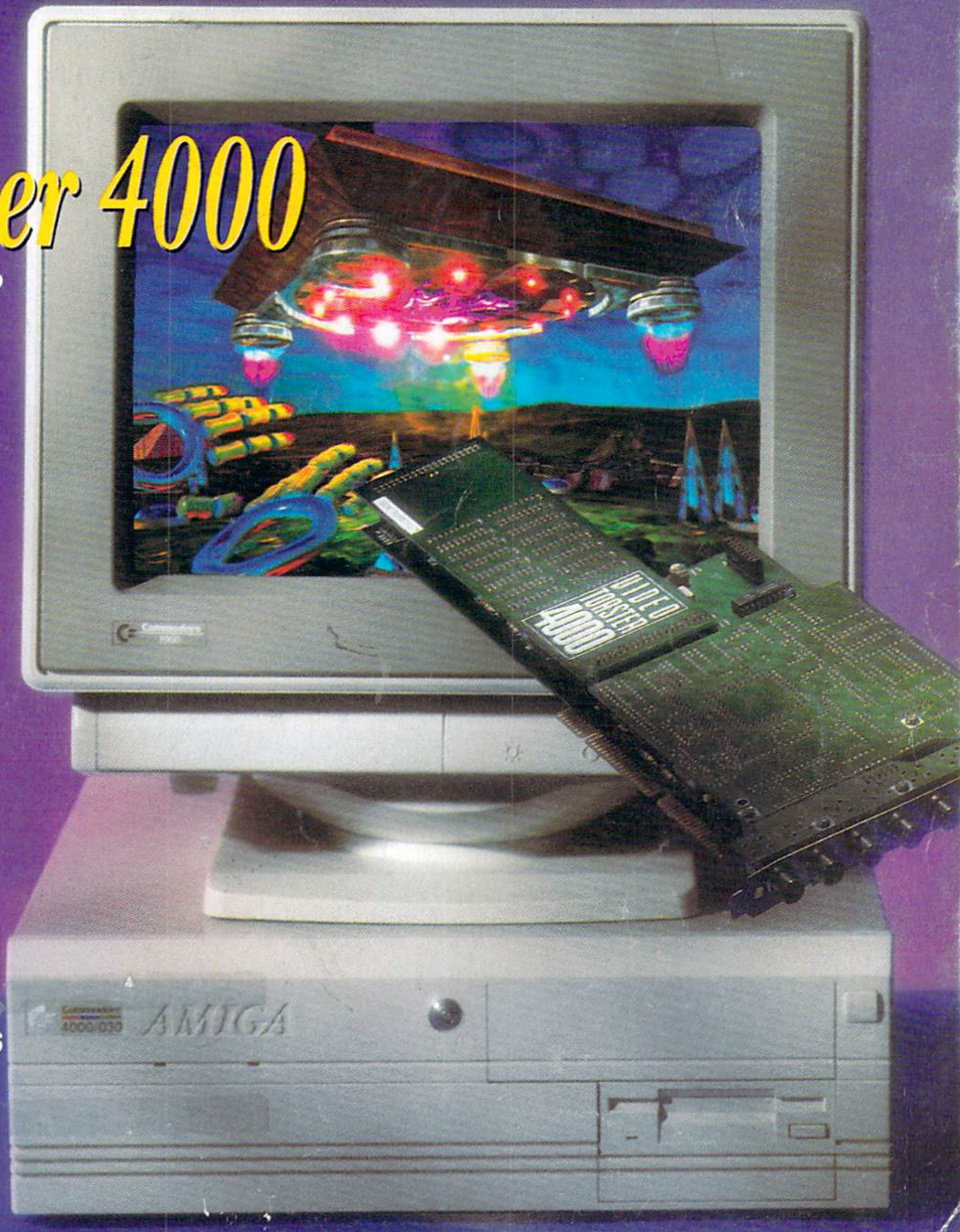
AMIGA WORLD

August 1993
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PREPARE FOR TAKE-OFF!

Video Toaster 4000

Full Coverage—p.22



From Todd Rungren's new video, *Theology*.

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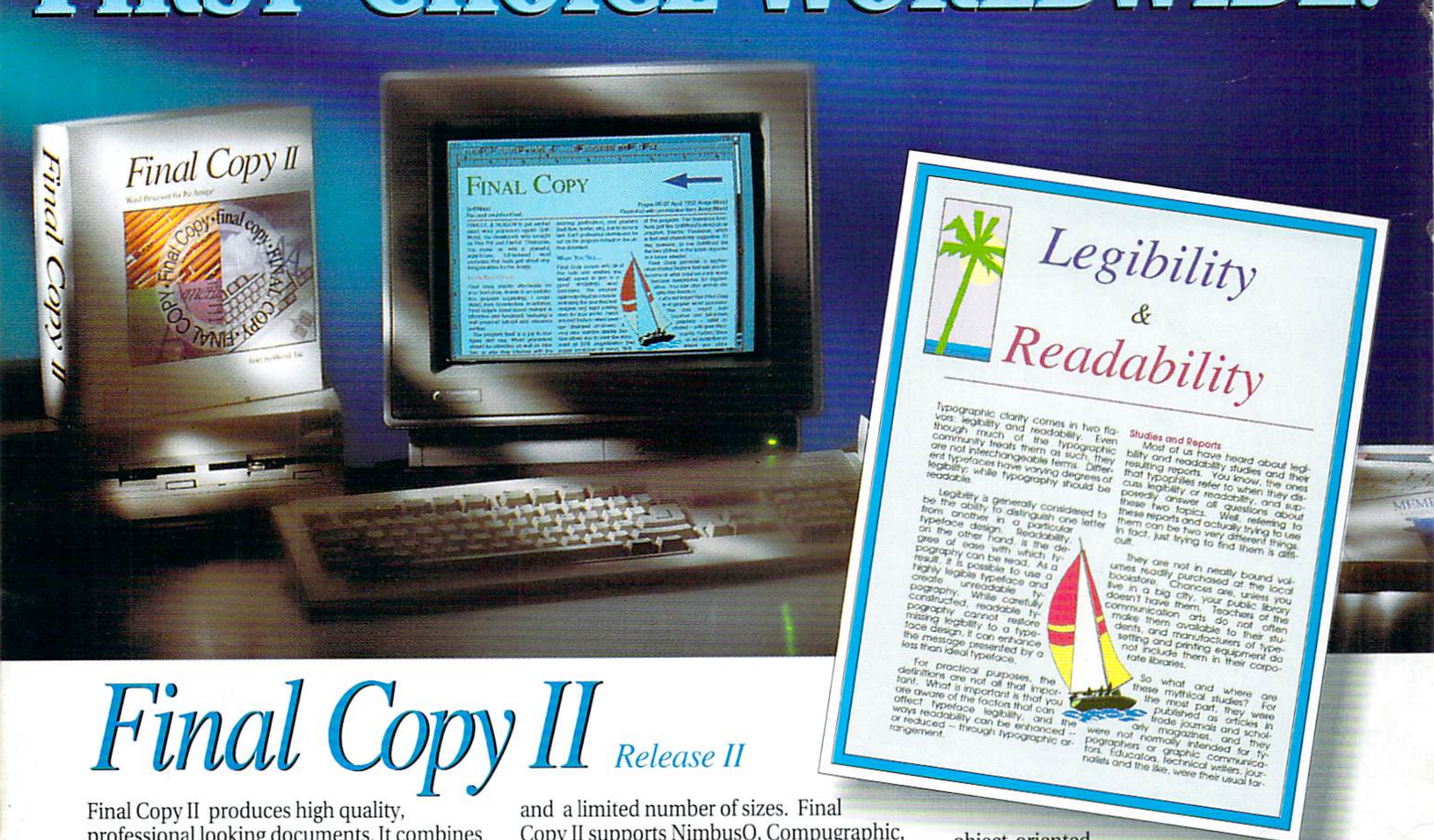
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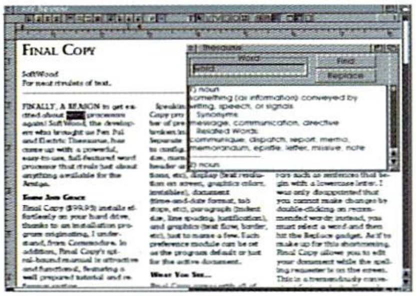
Final Copy II produces high quality, professional looking documents. It combines advanced word processing features, easy-to-use page layout capabilities, and state-of-the-art printing technology into one convenient program.

While other programs claim to have quality printing, Final Copy II is the only word processor on the Amiga that will produce excellent quality printouts on any Workbench (1.3, 2.0 or higher) supported graphic printer. If you have a PostScript printer, Final Copy II is the only word processor on the Amiga that has true WYSIWYG PostScript print capabilities - other programs limit you to a few fonts and a limited number of sizes. Final Copy II supports NimbusQ, Compugraphic, and Type-1 outline font formats giving you access to thousands of commercial and public-domain fonts.

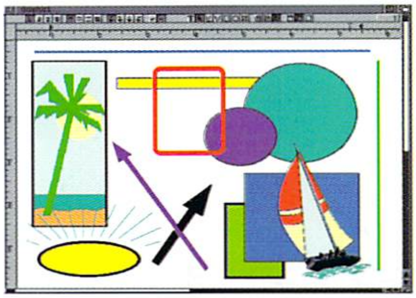
Final Copy II's word processing features include: 144,000 word speller; 1.4 million response thesaurus; automatic hyphenation; named paragraph style sheets; master pages; mail-merge; multiple newspaper style columns; search and replace; header and footer support; left, right, center and decimal tabs; paragraph justification; and automatic date, time, and page number insertion.

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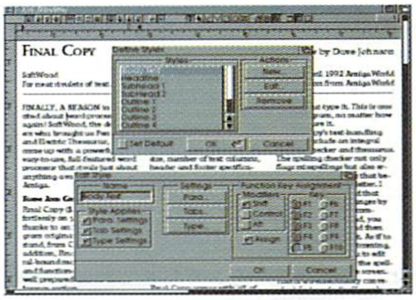
Final Copy II now available in American English, British English, German, French, and French-Canadian versions is the best selling word processor for the Amiga in the world. As stated in a recent AmigaWorld review, "FinalCopy II pulls into the lead of the Amiga word-processing pack."



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A3000
A4000

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With some 24 bit video boards you pay your money and take your chances. Chances that they'll be up and flying in the future. Chances that all the "enhancements" they promised will be around tomorrow.

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VOLUME 9, NUMBER 8, AUGUST 1993

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COLUMNS



Our Programming Special (see features on pp. 28 and 39) planned for August shares top billing with the brand-new Video Toaster 4000 (above), which will be released by the time this issue hits the newsstands. AW was able to get a pre-release version for a full, hands-on evaluation—and despite its taking full advantage of the A4000's AGA graphics, you may be surprised to learn this impressive new Toaster will also work with A3000 and, yes, even A2000 machines!

DEPARTMENTS

REVIEWS

GAMES

COVER PHOTOGRAPH BY EDWARD JUDICE / SCREEN IMAGE COURTESY OF NUTOPIA

EDITOR'S DRAWER

With a solid lineup in place and new developments on the horizon, CBM looks to the future.

Half-Full Or Half-Empty?

It's understandable that a combination of cutbacks and Commodore's disclosure of dismal recent-quarter financial results would stir this market and create conditions for rumors—full of doom 'n' gloom—to flourish. In chatting with readers, users, and developers, I sense that this pessimism, like a flu epidemic, is contagious. However, those who focus on hopeless hearsay disregard Commodore's plans for new products based on new technologies, as well as support for its existing crop of machines.

A close look at the market reveals the potential for continued success. There's too much going on for the leader in multimedia and video production not to make its mark. In recent issues we've reported on the new products the company is releasing and the new technologies—chip-set development, full-motion video, improved audio—in the works. There's much to be excited about now and in the future.

The A1200 is a super entry-level machine that compares favorably to Apple's computers and even to the ubiquitous PCs. The third-party community—as it has done with other Amiga machines—has rallied behind the 1200 to develop some interesting products—everything from GVP's Turbo+ accelerator board to RAM expanders and multifunction cards from several companies, including CSA, DKB, ICD, Elite MicroComputers, and Microbotics. Through aggressive pricing and promotion, Commodore has the machine and the support products to bring new users into this market. In addition to attracting new users, the microcomputing mavens at Commodore need to improve distribution and marketing efforts. The low-visibility status that Commodore maintains in this market may be OK if you're trying to sneak under enemy radar, but stealth marketing won't work in the promotion of products.

While much new development appears directed toward the A1200, the A4000, according to Commodore officials, is "the new base platform for development of future Amiga products." Leading the hit parade of new products for the 4000 is the new version of the Video Toaster (see p. 22), a.k.a. "the Toaster for Everyman." It will fit into the 2000, 3000, and the 4000, which is where it really shines, taking advantage of the AGA capabilities. It replaces megabucks' worth of video postproduction editing equipment and lets you produce broadcast-quality videotapes in your own home.

These developments position this market as one of the most exciting and creative. Amigadom features some of the most loyal and enthusiastic users whose commitment and support will, in turn, ensure the participation of developers. And, that will go a long way in quieting the voices of naysayers.

Dennis Brisson
Dennis Brisson
Editor-in-Chief

AmigaWorld

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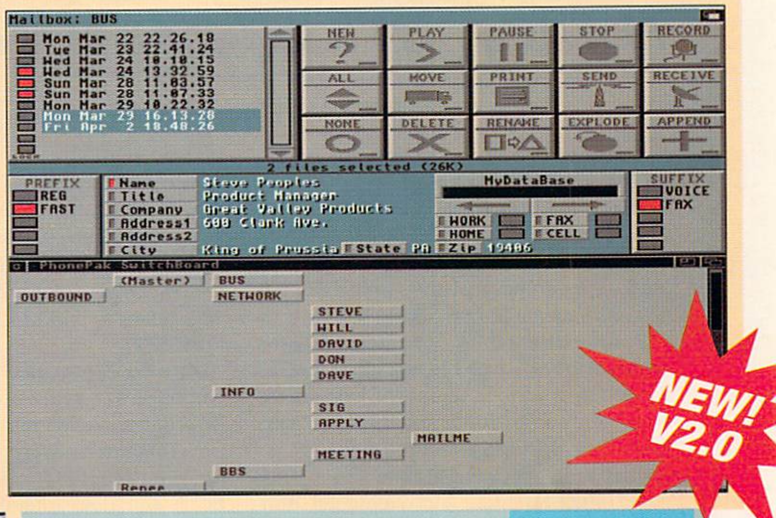
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OVERSCAN

News, New Products and Networks

AMIGA ABROAD

WEMBLEY, ENGLAND—In an attempt to increase foreign interest, several American Amiga developers, including ICD, MicroBotics, Supra, INOVATronics, and GVP, made appearances at the Amiga Format Live '93 show in May.

European exhibitors included ***Digita International***, which has released an AGA-version of its word processor, **Wordworth**, along with more fonts and clip-art disks. Rumors surfaced that a third version, expected to be released around year's end, could offer even more improvements. (RS# 140.)

Advanced Micro Interfacing (AMI) announced an adapter to allow Super-Denise equipped machines easy access to Productivity-mode graphics. A hardware interface that plugs into the Amiga's video port, it lets you connect a VGA or multisync monitor as well as standard-res devices. A software patch gives higher resolution to some older software; certainly the results on my VGA monitor were impressive, using Wordworth in four-color mode. (RS# 141.)

Power Computing (RS# 140) displayed a 1.76MB floppy drive for all Amigas with Workbench 2.0 or higher, along with memory and processor upgrades for the A1200.

Apollo Mercury's **VideoPilot V330** combines a computer controlled frame-perfect editing system with titling and effects in a box that has enough inputs and outputs for most applications. It is compatible with Scala and DeluxePaint IV software. Supporting VHS, S-VHS, 8mm and Hi8 videotape formats, the unit is suitable for high-end home or professional use, and is competitively priced at £1299 for the UK model. (RS# 142.)

Games players weren't left out in the cold, with the usual mob of school kids (and a few of their parents) crammed like sardines into the show's arcade. ***Virgin Games*** (RS# 143) showed **Goal!** (a soccer simulation), **Dune II**, **Apocalypse**, and **Beneath The Steel Sky**. ***Gremlin Graphics*** (RS# 144) announced **HeroQuest II—The Legacy of Sorasil**, and **Litil Divil**—both looking promising for imminent release.

Through the Grapevine

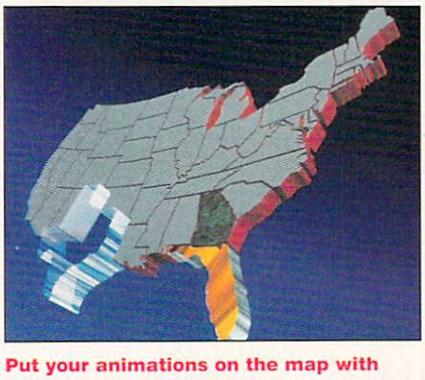
Back in the press office, the main rumor was of a completely new machine from Commodore—a 32-bit RISC-based machine that moves away from the 68000 family completely. Details were very sketchy, but revolved around a 24-bit color card (to give 16 million colors in certain screen resolutions) and eight-channel high-quality stereo sound. Not surprisingly, Commodore was tight-lipped about the whole affair, as with talk of an Amiga based on the forthcoming Motorola 68060 processor. More rumors suggested the development of an A1200-based CDTV, that would be compatible with

Continued on p. 8.

OBJECTIVE REALITY

Here's the latest sampling of CAD objects available for the LightWave animator. **The United States** ($24.95, ***Associated Image Group***) contains US map objects and individual state objects (including Alaska and Hawaii) that you can incorporate into your animations. As a bonus, an entire globe object is provided to use as an image wrap on a sphere to create your own world! (RS# 120.)

From ***Dimension Technologies*** come two object packages: **The Cathedral: For LightWave** ($99.95) and **Odds & Ends: Objects for LightWave** ($59.95). The Cathedral features realistic texture maps and surfaces of a cathedral with more than 40,000 polygons and 50 stained-glass windows. The package also includes scene files to assist you in animating, so that you can circle the cathedral and even "walk" down its aisle.



Put your animations on the map with The United States.

Odds & Ends, a supplement for LightWave's Phonebook, is a collection of 200 objects encompassing many categories such as music, education, and video. (RS# 121.)



OVERHEARD

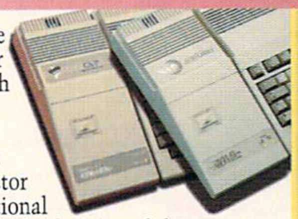
Tulsa Junior College in Oklahoma now offers an Associate degree program in Desktop Video Production for students with an interest in television production, music, and graphic arts. The program uses Amigas exclusively, with students working mostly on A1200s and A2000s equipped with NewTek's Video Toaster. For more information contact Tony Krehbiel, Chairman of Business Services/Computer Science at 918/631-7039.

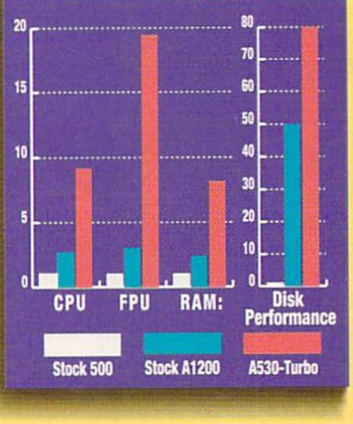
To locate the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 94.

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A500

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Don't let *anyone* tell you that your A500 is obsolete! Adding a GVP **A500-HD8+™** or an **A530-Turbo+™** will make your A500 feel like a totally new machine. Our **A530-Turbo+** will make your A500 fly 4 times faster than an A1200 and many applications will run almost as fast as on an A4000! All this for much less than buying a new A1200 with a hard drive!

Both the **A500-HD8+** and the **A530-Turbo+** feature beautifully styled cases, fast DMA SCSI controller with external SCSI "pass through", SIMM sockets for adding up to 8MB of FAST RAM expansion, built-in high-speed SCSI hard drive (choose from 40MB to 540MB!), "Game Switch" to disable the whole unit for compatibility with older games, and GVP's exclusive internal mini-slot expansion connector for adding our optional 16MHz PC286 (PC Emulator) module!

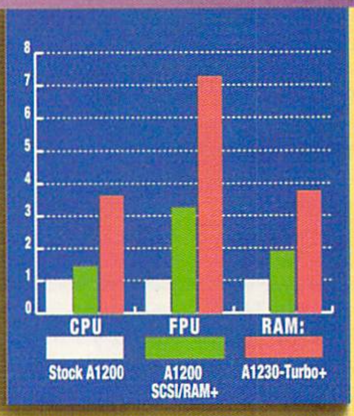
The **A530-Turbo+** also features a 40MHz 68EC030 CPU (accelerator), optional 40MHz 68882 FPU (Floating Point math co-processor, and 60ns, 32-bit wide FAST RAM.

If you already own a hard drive, call for details on our great "**A530-Turbo+** Trade-Up!" deal.

A1200

A1200 USERS





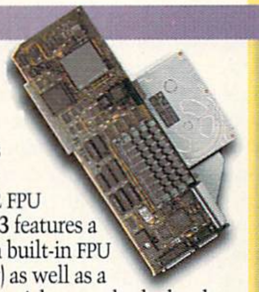
The A1200's AGA graphics are great, *but* they eat up memory and can be slow with the built-in 68EC020 processor and no FAST RAM. GVP now offers two exciting Power-Up solutions.

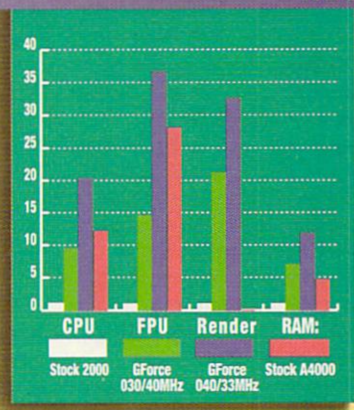
GVP's **A1200 SCSI/RAM+™** (a.k.a. "FANG") features SIMM sockets for up to 8MB of 60ns, 32-bit wide FAST RAM expansion, a high performance DMA SCSI controller allowing installation of an internal 2.5" SCSI hard drive, and an optional 33MHz 68882 FPU. The optional external SCSI connector kit allows you to attach *large* SCSI Hard Drives, CD-ROM drives, SyQuest drives, Tape Backup drives, or any other external SCSI device. Although the **A1200 SCSI/RAM+** supports faster FPU's, our tests show that the A1200's 14MHz 68EC020 cannot really take advantage of a 68882 running faster than 33MHz.

If you want your A1200 to fly past the A3000 and approach the A4000's performance, our **A1230 Turbo+™** accelerator (a.k.a. "JAWS") is for you. The **A1230 Turbo+** features a blindingly fast 40MHz 68EC030 CPU, SIMM sockets for up to 32MB of *fast* 60ns, 32-bit wide memory expansion, and an optional 40MHz 68882 FPU.

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Don't let *anyone* tell you that the A2000® is obsolete! Adding a GVP **G-Force 040/33MHz™** Accelerator will make your A2000 outperform the fastest A4000/040 and you'll spend a lot less! If you are on an even tighter budget try our **G-Force 030/40MHz™** Accelerator and you will zoom past *both* the A3000 and A4000/030.

All our G-Force Accelerators feature a high-performance DMA SCSI controller and 4MB of *fast* 60ns, 32-bit wide RAM, expandable up to 16MB by using our 4MB SIMMs. The G-Force 040/33 also accommodates our new state-of-the-art 16MB SIMMs allowing expansion up to a massive 64MB of *fast* 60ns, 32-bit wide memory. Our optional SCSI Hard-Drive mounting bracket turns either model into the ultimate "Hard-Disk-Card" without using a Zorro expansion slot or a peripheral bay.

The **G-Force 030/40** is equipped with a 40MHz 68EC030 CPU and 68882 FPU while the **G-Force 040/33** features a 33MHz 68040 CPU (with built-in FPU and large cache memory) as well as a high-performance RS232 serial port — backed up by two FIFO hardware buffers to prevent data loss — and a parallel port to give you more flexibility to add modems, multiple printers, digitizers, etc....!

Don't feel left behind by the A4000, power your A2000 beyond it with the awesome processing power, flexible SCSI interface, and unmatched expandability of a GVP accelerator.

We didn't become the largest Amiga developer by accident — it took hard work, dedication, and engineering excellence. Don't take a chance. Choose GVP — the winner of 4 *Amazing Computing* Reader's Choice Awards — for your storage and acceleration needs.

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A few words about the tests: The CPU and FPU test results were generated by AIBB 5.5 by LaMonte Koop. The Render test results for the A2000 were generated with LightWave 3D by NewTek. The RAM and Hard Disk test results were generated with DiskSpeed 4.2 by MKSoft.

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Kodak's Photo-CD system, but other trade reports suggest a CD-based console.

While Atari's Falcon is apparently suffering from a lack of serious interest, the Amiga continues to gain popularity in Europe. More than 60,000 A1200s have already been sold and professional uses for the A4000 and A4000/030 (especially in music and video) are ensuring the strong foothold in Europe.

—Stuart Menges

Colorful Additions

Soft-Logik is launching the Soft-Logik Graphic Library with: **3D Flags of the World** and **Amiga Computer Art** (each $125).

3D Flags of the World contains more than 190 full-color international flags of countries and organizations (such as The Red Cross and The United Nations). You can remove the beveled edges of the flags (which give their 3-D appearance) using a compatible illustration program. The flags are stored in Adobe Illustrator 88 EPS format and can be output to PostScript printers or to any other printer with Soft-Logik's PageStream 2 or Art Expression.



Add international color with 3D Flags of the World.

Amiga Computer Art contains full-color illustrations of Amiga computers and accessories ranging from a Toaster station to a flatbed scanner. You can output the illustrations (in Illustrator 3 EPS format) directly to PostScript printers or to any printer via PageStream 3. (RS# 130.)

Virtual Reality Sharpens Reflexes

When reality is too risky, virtual reality (VR) can help. The Seattle-based Ixion Inc., for instance, has pioneered VR training devices that allow surgeons to practice delicate operations using computers, including Amigas.

At the recent National Association of Broadcasters' (NAB) convention, Ixion president David Hon demonstrated how variable tactile feedback can help develop skills in abdominal surgery. Surgeons can manipulate simulated pathologies with remote-control tools across a real-time video-disc map of the inside of the body. "We use laparoscopy to make complete digitized still-photos of the gastrointestinal system, then activate the system with 3-D computer animations, which react according to realistic laws of physics," Hon explained. The partnership of video and computer graphics simulates actual experience with both visual and tactile accuracy. Hon uses the Amiga and NewTek's LightWave for much of the 3-D modeling with a low-end Silicon Graphics workstation for the medical simulations.

Ixion's simulations often use touchscreens with x, y, and z matrices for 3-D responsiveness. Even more astounding is the life-like dummy created for Ixion's Robotic Endoscopy Simulation, which enables surgeons to develop neuro-muscular coordination and psychomotor skills. The computer graphics mimic an operation based on the surgeon's manipulation of the tools.

Try This At Home

If you are eager to experience virtual reality on your own Amiga, try ***Ixion's* VR Slingshot** game ($149), which immerses players into a 3-D world using a powerful physical model and peripherals such as stereo glasses and sound, and a special analog joystick that responds like a flightstick. You can play alone or connect by modem with a friend in the same virtual world.

The game features a dynamic airborne dogfight where terms of conflict revolve around "spherical gravity generators"—gravitational forces that players use strategically to increase flight speed and enhance energy efficiency in their crafts. When you zap the opposition fighter with an energy beam, the force spins the craft; as you move into a nosedive or other evasive maneuver, the firing path adjusts to the new trajectory.

The 3-D effect and realistic physics give a feeling of being within the environment, far different from the distance you maintain with a 2-D game. VR Slingshot works on any Amiga equipped with a 68020 accelerator, although an A3000 or A4000 with a 68030/040 is recommended. (RS# 145.)

—Patric Hedlund

Programming Possibilities

TorqueWare ($100 for base development system, ***AugmenTek***) creates programs that can run on networked Amigas. Using the C-Linda programming model, TorqueWare uses the power of each computer to solve problems. The base development system consists of a C-preprocessor, stand-alone local libraries, a user interface, and on-line documentation. An Amiga network is possible with the addition of the TorqueWare network link library, sold separately at $200 per CPU. To use TorqueWare you need AmigaDOS 2.04 or higher, a SAS/C compiler, and 3MB of RAM. For the network link library you also need CBM's A2065 Ethernet card and AS225 2.0 TCP/IP software, plus 1.5MB of RAM. (RS# 128.)

Two ARexx support products are available from ***Dineen Edwards Group***: **Rexx Plus Compiler 1.3** and **The Rexx Rainbow Library Series**. (RS# 129.)

The updated Rexx Plus Compiler ($150; $20 for current owners) saves disk space and quickens load time by generating smaller programs—10% smaller with default settings and 40–60% smaller with runtime library options. Rexx Plus claims to make ARexx programs execute nearly 18 times faster and to make debugging easier. Rexx Plus Compiler requires 1MB RAM and is compatible with AmigaDOS 1.3–3.0.

The Rexx Rainbow Library Series ($48 each) is a line of support libraries, each of which has functions for a specific subject. For example, one volume, Stem/Array Functions, contains functions to manipulate single-dimension arrays. Rexx Rainbow libraries are compatible with AmigaDOS 1.3–3.0. Used with Rexx Plus, all the functions in each volume can be included as part of the language. ►

MacroSystemUS
PRESENTS

RETINA



Retina™ - 24Bit Frame Buffer and Workbench Emulation

Output: DB-15 VGA Connector - Analog RGB output Supports 15 - 75KHz Hor. Freq. and 50 - 95 Vert. Freq.

800x600 full 24Bit 16.7 Million color Display Non-Interlaced. Allows multiple 8, 16, and 24Bit Resolutions.

Full Workbench Emulation with resolutions such as 1024x768 or 1280x1024 in 16 colors or even more! Up to 2400x1200! Compatible with Amiga 1950,1960 and VGA and up monitors.

Ram Configurations 2 Megabytes or 4 Megabytes. 4MB allows double buffering for animations.

Compatible with the A2000, A3000, and A4000 series Amigas. Installs into any 100 pin Amiga slot does not use the video slot. Compatible with the Video Toaster and OpalVision.

XIPaint is a real-time 24Bit paint program that comes with the Retina.

The Retina can still be used to display 24Bit graphics while emulating Workbench at a maximum resolution of 1280x1024 non-interlaced and you could have AdPro running on it's own screen at 320x200.

You can change the output resolution for any program simply by choosing the program name and then selecting a different screen resolution for that program.

Compatible with programs such as AdPro, Morph Plus, MultiFrame, TVPaint, ImageFX, ProPage, ProWrite, PageStream, DynaCadd, Imagine 2.0 to name a few.

The Retina requires the 2.0 or greater operating system.

VLab



VLab™ - RealTime Video Digitizer

Digitizes a full frame in 1/30th of a second or 1 field in 1/60th of a second. Digitizes in full Broadcast NTSC or PAL

Will save images as 24Bit, YUV, or any Amiga format including AGA modes like Ham8.

The VLab™ has 2 Composite Video inputs.

The VLab will work in the A2000, A3000 and the A4000 series Amiga Computers and does not use the video slot.

There is also a VLab1200 that allows owners of the A1200, A500, A600 to also use the VLab.

The VLab does not require a frame accurate video player to hold the image still to digitize.

The Vlab will in real-time digitize any frame from the video source that you have connected.

You can digitize images from cable TV, Broadcast TV, VCR, Video Disk Players, and Video Cameras.

The VLab is supported by popular Graphics software such as ASDG's Art Department Professional, TVPaint by TechSoft, MultiFrame by MacroSystemUS.

There is a special monitor window that allows you to see the video signal that you have attached to the VLab in a window on the VLab screen in up to 16 gray scales.

The VLab software requires the 2.0 operating system or higher and is fully ARexx compatible.

The VLab is compatible with the Video Toaster, OpalVision, Retina™, and Harlequin.

The VLab is also supported by the Nucleas Personal SFC.

MultiFrame *for AdPro*

MultiFrame is a front end for the Art Department Professional and Morph Plus that allows you much greater control over multiple-frame processing. You can manipulate single or multiple images over time creating special effects with just a few mouse clicks. The perfect tool for creating effects with a large number of images for output to video.

MultiFrame Features:

-Process images over time - most processes can be manipulated with a starting value and an ending value with the separation being the number of frames that you choose to make. Generates all frames automatically for you.

-Non-linear motion interpolation using true splines with adjustable knots, tension, continuity and bias. Full spline-controlled variables.

-Perform ADO-style fly-ins of moving images easily using MORPHPLUS perspective operator.

-Create a morph from a flat to a sphere using SPHERE with EFFECT start and end values of 0 and 100 respectively.

-Multiple frame/Multiple Ripples, allowing ripples that start at different times that accelerate/decelerate over time and can move.

-Use the compositor to rotoscope images using foreground images, background images and alpha for matting images over others.

-Automatic compositing of images over backgrounds using true alpha-channel/holecutter/key effects.

-Use a black & white animation as a wipe-pattern, transition between a background sequence and a foreground sequence using the B&W frames as an alpha sequence in compositor.

-Create panning/tilting camera effects on still images or sequences. Movable skew/tiling effects with panning/tilting camera moves.

-Auto triggering of 4 GPI (General Purpose Interface, optional) functions for recording/control of devices such as Digital Disk Recorders from SONY and ABEKAS.

-Complex operator/processes (sphere, perspective, etc...) now allow loading and saving of all parameters for easy recall.-Automatic conversion of any supported image format to any other format (including ANIM-5/ANIM-8 and Toaster FRAMESTORE) during processing.

MacroSystemUS

Mt.Clemens, MI 48038 (313) 263-0095 Phone (313) 263-9639 Fax

Up and Coming

Simpatica 2.0 ($560, ***Optonica***), the single-frame editing system, now features AGA support in 256 and HAM8 modes, and a 24-bit rotoscoping system that digitizes sequences of video frames from tape. Optonica also offers **Video Timelapse** ($560) for stop-motion sequences and time-lapse video to create such effects as claymation. Simpatica 2.0 and Timelapse are available together for $878.40. (RS# 136.)

DataPath is releasing a series of tutorial videos on Impulse's Imagine 3D. The first release is **Imagine the Detail Editor Made Simple** ($34.95), which will be followed by Imagine Animation Made Simple and Imagine Advance Techniques Made Simple. Each two-hour video is a complete walk-through of the animation process with helpful examples and tips. (RS# 146).

The **Amiga TroubleShooter** ($9.95, ***Grapevine Group***) is a quick-check reference chart that pinpoints common problems from faulty IC components on the A500, A2000, and A2500. (RS# 135.)

Inspired by the WWII flight simulator, Fighter Duel Pro, **Fighter Duel Pro Flight Recorder** ($79.95, ***Jaeger Software***) is a motion-path generator for use with NewTek's LightWave 3D, Impulse's Imagine, and Virtual Reality Labs's VistaPro. Flight Recorder simultaneously records the altitude and position of three aircraft at 30 frames per second. You can import the resulting motion path into your 3-D software to animate objects or the viewpoint.

Fighter Duel Pro Flight Recorder requires 3MB of RAM and Kickstart 1.2 or higher. Owners of Fighter Duel Pro (the game) can upgrade to Flight Recorder for $25. Optionally, with the FDPro Parallel Adapter ($20) you can connect Fighter Duel Pro or Flight Recorder to another Amiga to display the view from the rear of the aircraft. (RS# 134.)

A4000 Add-On

The **Toaster Toolbox 4000** ($299, ***Desktop Video Systems***) adds eight expansion slots to the A4000 for internal peripherals for the Video Toaster (NewTek) such as edit controllers and sync generators. Although the Toaster Toolbox 4000 was primarily designed for use with a Toaster-equipped A4000, it is compatible with any Amiga system. (RS# 131.)

Video Captions

With **Euro-Titler** (£180, ***Zen Computer Systems***) you can compose, edit, cue, and display subtitles for your Amiga-based video productions. You can load ASCII text from a text editor or a word processor using standard Amiga fonts. Subtitles can appear with or without a solid background box. Euro-Titler includes drivers for an external time-code reader or an internal VITC/LTC card such as Zen's **VITC Reader Card** (£450). If you desire professional broadcast quality, Zen also offers an enhanced version—**Euro-Titler Broadcast** (£380), which requires an Aston 4 Caption Generator to create the background and fonts while an Amiga controls text and timing. (RS# 137.)



ON-LINE SCAN

By Tim Walsh

If you pay a visit to any network you will surely be overwhelmed by the countless ARexx files available—from text editors to graphics applications. Bear in mind that programmers are the source of almost everything to do with ARexx. With few exceptions, both the documentation and descriptions of on-line ARexx files are meant for other programmers, so many an ARexx gem goes overlooked by the masses. (Most people don't realize that installing one of these files usually requires copying only a file or two to the Rexx directory.)

What are the least technical ARexx must-haves?

On GEnie, ARTUT.LZH (file# 12756) from Library 32, contains text files of a 1989 conference with ARexx guru William Hawes—something akin to tennis lessons from Steffi Graf. Most of the subject matter is still current, as are the multiple script examples packed in this ARexx masterpiece.

Before departing GEnie, get a copy of HACK2.1.LHA (file# 19191), also found in Library 32. It is one of the best utilities for using ARexx to add eye-catching and useful gadgets to the Workbench.

Moving on to BIX, don't download artut.lzh if you've already captured ARTOT.LZH from GEnie—it's the same file. Your collection of ARexx utilities isn't complete without mxreq.lha. This small (19K) file houses MXReq version 1.2 by Andre Weissflog, which creates mutual exclude requesters. Found elsewhere in BIX, rxser502.lha (ARexx Serial Device Function Library version 5.02) provides an interface between ARexx programs and any Amiga serial device.

Portal offers an entire library of ARexx files in its Amiga area. Most notable is GENEREXXT. LHA (GeneRexxT Version 2.1.), which creates ARexx scripts for ASDG's Art Department Professional and Axiom's Pixel 3D 2.0, and offers automated conversion for NewTek's Toaster framestores to and from RGB mode. The file's Pixel 3D support includes rapid conversion of 3-D objects to various formats.

Also on Portal is AREXXAPPLIST0293.LZH, which contains the ARexx Application List by Daniel Barrett. The ARexx Application List is the most current and complete list found on any network at this writing that offers ARexx compatibility.

In the AmigaTech area of CompuServe you will find ABC.LZH, a script that batch converts files loaded into ADPro from one format to another. If you're like me, you probably waste time by manually selecting options to load an IFF file for conversion to JPEG format; ABC.LZH makes that and similar processes automatic.

Finally, if you use AutoPilot to access CompuServe, check out the ARexx utility APSCAN.LZH, which automatically extracts file data from .LST files and GETSTK.LZH, which obtains stock quotes. Another file, GETWX.LHA uses an ARexx script to automatically retrieve weather forecasts from within AutoPilot.

BIX
800/695-4882
617/354-4137/

CompuServe
614/457-0802
800/848-8199

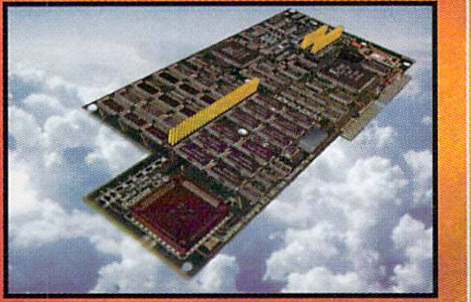
GEnie
800/638-9636

Portal Communications
408/973-9111

OpalVision

24-bit Video and Graphics System

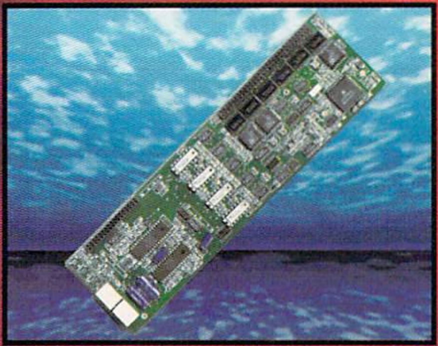
OpalVision™ Main Board



A true 24-Bit frame buffer and display device with 16.8 million colors available for every pixel and a maximum resolution of 768 x 480 (580 PAL). An internal card, it operates automatically in NTSC or PAL mode in any Amiga computer with a video slot (including the Amiga 4000). It's powerful VLSI graphics coprocessor enables stencil modes, a host of transition effects and smooth, hardware-controlled priority switching and scrolling/panning effects. The board's state-of-the-art design allows smooth fading of pictures, color-cycling effects, and smooth, double-buffered 24-Bit animation. Includes critically acclaimed and award winning OpalPaint™, Opal Presents™ and OpalAnimMATE™ software.

New incredibly low price $699

The best is now even more affordable



OpalVision Video Processor™

Plug this card into the OpalVision Main Board and add a wealth of additional features and functionality. It's a high-quality, real-time 24-Bit framegrabber which doesn't require a time-base corrector. And, it's a professional-quality genlocker with chroma and luma keying. The 256-level linear transparency key allows the definition of transparency between two live video sources on a pixel-by-pixel basis for smooth vignettes, anti-aliased text and super-smooth effects. The Video Sandwich key allows you to insert chroma or luma keyed video between definable foreground and background layers of a 24-Bit image. It also provides real-time color processing of live video and an unlimited number of transitions and Digital Video Effects using the included OpalVision Roaster Chip and software. These include cuts, wipes, fades, and special organic effects (soft- or hard-edged), plus an infinite range of flips, tumbles, picture-in-picture, page peels and image wrapping.

OpalVision Video Suite™



This power-packed video and audio mixing, switching and transcoding device connects directly to the Video Processor. This 19-inch, rack mountable unit is so advanced that it has its own internal computer and every aspect is software-controlled for precisely timed and accurate functionality. The Video Suite includes a wealth of inputs and outputs. There are 9 video and 10 audio inputs available, plus the 24-Bit frame store. Professional quality video inputs and outputs are available simultaneously in RGB or Y/R-Y/B-Y, Composite and S-Video. Choose any 2 sources from these inputs, assign a transition or special effect, and then trigger it manually or automatically. All of the transitions and effects provided by the OpalVision Video Processor are available for use by the Video Suite. The linear transparency key (Alpha channel and transparency effects) can be taken from the Video Processor or an external video source, and/or output to another production switcher. This allows transparency control between video sources on a pixel-by-pixel basis. The 10 Audio inputs (five stereo pairs) are fully software-sequenced with smooth fades and full, 5-band frequency equalization.

OpalVision Scan-Rate Convertor/TBC

Add this enhancement card to the Main Board and achieve 31Khz, non-interlaced output of Amiga and OpalVision graphics and animations. It also de-interlaces any incoming video source in either PAL or NTSC and includes full time-base correction of incoming video. The on-board memory also serves as a separate frame-store for dual framebuffer applications.

REVIE

ARexx script generator for video hardware and software integration.

T-Rexx Professional 2

ASDG, $249.

All models.
Not copy protected.
2.0/3.0 compatible.
Hard drive installable.
Accelerator compatible.
Minimum system: 2MB, AmigaDOS 2.0 or higher.

ASDG recently acquired the code of T-Rexx Professional, made some substantial revisions and enlargements, and released Version 2. Good news for Video Toaster users.

Commands at Hand

Those familiar with the earlier version should take note that screen control of the main program has not changed substantially, but it has been expanded. The primary idea is ARexx control, and lots of it. You control virtually every aspect of the Video Toaster's functions through a user-generated script by pushing buttons. The script window is large enough (roughly 25 lines, depending on the font) for easy viewing, editing, and debugging, and it displays your script in either ARexx or plain English.

Basic editing commands include cut, copy, paste, insert, delete, undo and find. Once prepared, the editing screen can test finished scripts, or it can test commands in real time as you enter them. If an error occurs during script execution, the editing screen appears with the offending line highlighted. Up to six separate scripts can reside in memory simultaneously, so you can paste and rearrange blocks of repeated commands or previously designed modules as you would with a text editor or word processor. Script creation, testing, and execution were never so easy.

The Business Screen

Because all the Switcher buttons on the main edit screen trigger the insertion of ARexx commands into the script, it is natural that T-Rexx Pro should provide the same facility for other ARexx-accessible programs. A nicely integrated rocker switch on the T-Rexx Pro edit screen scrolls through the available programs and commands.

To locate the vendors of the products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 94.

Processing possibilities are far-reaching. Given enough system resources, you can, from one simple assemble script, control a VCR, grab a frame, load it into ASDG's ADPro for a series of prearranged manipulations, and save it out in one fell swoop. *(For some other image-processing possibilities using ARexx with T-Rexx Pro 2 and ADPro, see "Directing Graphics Traffic with ARexx," p. 39.)*

Three other included programs are accessible from the edit screen (or from their own icons): T-Rexx Command Editor (TCE), Project Editor (PE), and FramestoreFM (FFM). One click loads the selected program into memory, a second click makes it active, and a shifted click removes it from memory. TCE allows for creating, editing, and arranging banks of command buttons.

On the down side, the manual is a bit thin on instructions, but by checking out an existing set of commands you can fabricate a new command without too much difficulty. T-Rexx Pro comes complete with command sets for all Toaster programs (Switcher, ToasterPaint, LightWave, and Genlock), as well as DQ-Taco (Diaquest), Personal TBC2 (DPS), AmiLink/CI, CLD-V2400 (Pioneer laser-disc player), BCD2000A (BCD Associates' single-frame controller), MediaPhile editing systems (Interactive MicroSystems), VISCA (Sony devices), PC-VCR (NEC), Personal SFC (Nucleus), Pixel 3D (Axiom), Studio 16 (SunRize), ADPro, ARexx (William Hawes), and LightTV (a T-Rexx Pro utility).

Toast As You Like It

FFM is a multifunction program for all manner of Toaster Framestore management. Once it locates your directory of frames (Framestore or any other directory), you can build a black-and-white picture database of all the frames in that directory. It's a quick process—my '030-based Amiga built a database of 32 frames in about three minutes. Even frames that haven't had these "stamps" can be viewed quickly on the Amiga's monitor at full size

W S

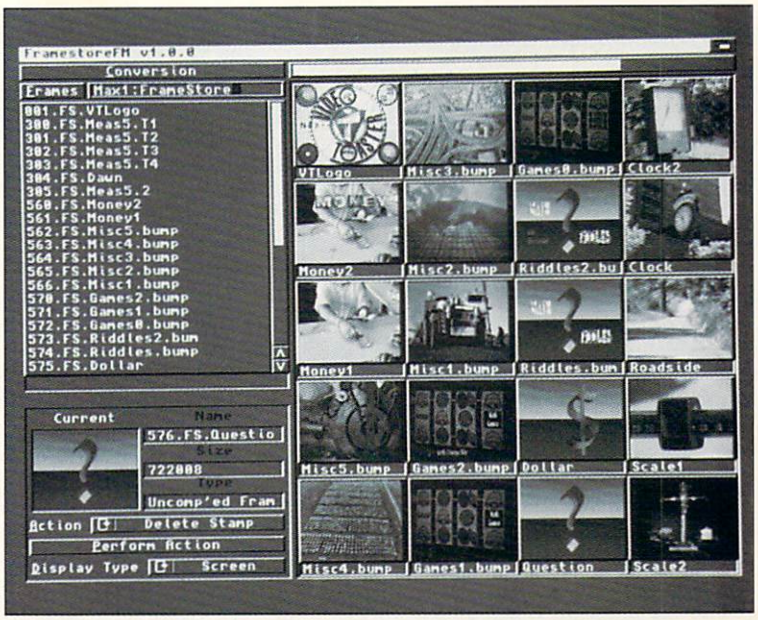
in 16 levels of gray scale on original and ECS machines, and in 256 levels on AGA computers. If the Toaster is running, you can also view them on either framebuffer with a simple double click.

Other FFM actions include renaming, deleting, and converting frames. The conversion business, handled by a subprogram (FStoIFF), involves compressing and decompressing frames and converting them to IFF24 (RGB in Toaster talk) format files. The task is performed—whether or not the Toaster is running—in almost less time than it takes to tell about it.

PE is another indispensable tool for Toaster users. It allows the editing and substantial rearrangement of the Project configuration of effects, effect speeds, and background and border colors. It's handy for removing Kiki-effects and replacing them with professional ones. The concept is not original, but the organization and execution is refreshingly complete. Presets for each effect can be modified, and new effects can be created from brush ANIMations. You can apply various "special effects"—such as flips, rotations, and mirrors—to a basic animation to create variations (new effects).

Beneath the Streets

A number of other utility subprograms also populate T-Rexx Pro. These include LightTV (a LightWave controller that converts rendered frames to DCTV-format single images or ANIMations); FSView (quickly displays a gray-scale image of a frame); ShareFX (allows for easy distribution and installation of new effects you create); Sentry (monitors a directory and performs specified ARexx or CLI commands on new or updated files); and FStoIFF.



T-Rexx Pro 2 allows you to build picture databases of Toaster Framestores for quick and easy viewing.

T-Rexx Pro brings to Video Toaster users, multimedia producers, and artists a collection of useful utilities that work well. With the program, Toaster users can control through ARexx scripts virtually every aspect of all the Toaster's "slices" and can easily produce projects—from slideshows to complex, multisource edits. You can also add multimedia machine and program control to scripts through the command sets. Artists can use all of T-Rexx Pro's facets to grab, process, and convert frames, and pack them automatically into complex ANIMations with an easily constructed script. In any phase of production, you never have enough hands or enough time. T-Rexx Pro provides both.

—Michael Hanish

Multitasking Macintosh emulator board and software.

Emplant

***Utilities Unlimited,* $279.95;**
w/serial: $349.95; w/SCSI: $349.95;
w/serial and SCSI: $399.95; Sybil: $99.95

Amiga 2000/3000/4000
Hard-drive installable.
Not copy protected.
Accelerator compatible.
1.3/2.0/3.0 compatible.

Minimum system: 2MB, accelerator (68020 through 68040).
Recommended system: 4MB, 68030 or 68040.
Installation: Easy.

During the past eight years, the Amiga has served as the development bed of choice for some fascinating hardware devices. Inspired hackers and engineers produced wonders such as ReadySoft's A-Max, Digital Creation's DCTV, and NewTek's Video Toaster. Utilities Unlimited now adds the Emplant to that impressive list.

Mac-in-the-Box

Emplant is the long-awaited emulator board pro- ►

viding full-color Macintosh II, IIx, IIcx, and SE30 emulation. Not designed to take over the system as A-Max does, it was touted to peacefully coexist in a fully multitasking environment. Billed as a third-party Macintosh bridgeboard, it promised to simultaneously run two (or more) computers at full speed in one box.

The Emplant is a standard Zorro board with vacant ROM sockets waiting to hold the ROM chips of the machines it emulates. One socket holds the ROM SIMM used in later Mac IIs, and four other sockets hold the four ROM chips used in earlier versions of the MAC II. These four sockets can also hold EPROMS and static RAM chips for devices like recoverable ram disks (not yet available).

The big question is whether it works. With reservations, the answer is yes. Obviously in haste, Utilities Unlimited released Emplant for general sale before all its features were implemented, working properly, or even adequately explained. To be sure, the Emplant does create a working Macintosh on an Amiga screen with harmonious multitasking and screen-manipulation abilities. (It's so Amiga-compliant that you can even use Amiga screen-capture programs to take IFF screen shots of the Mac desktop.)

Support for both the Mac System 6 and 7 operating systems is present, though earlier versions of System 6 are less than reliable. As advertised, it operates faster than the equivalent Mac, and you can power it down without rebooting the Amiga system, even if the Mac side crashes. The latest version of the Emplant software (v2.5) runs under AmigaDOS 1.3, but future upgrades will require 2.0 or higher.

The color support also works as promised. The Emplant properly displays 16-color Mac programs on standard ECS Amigas, and full 256-color programs on Amigas with the AGA chip set. Future upgrades promise to allow Amigas with 24-bit graphics boards to run Mac software in 256-color mode, but for now it supports only the Retina board. The color emulation also works, though some games and shareware programs that deviate from standard Mac rules may crash.

Drivetrain Pain

Drive support is more involved and, sadly, problematic. The Emplant can create Mac-formatted partitions in unused Amiga hard-drive partitions, but only up to 31 megs each. Emplant does, however, allow Mac hard drives connected to the board to be formatted to their full capacity. Fortunately, the Emplant can also find and boot from A-Max partitions on Amiga hard drives, and you can connect Emplant boards with the SCSI option to Mac-formatted SCSI hard drives. This makes upgrading from a Mac or A-Max much easier than jumping cold into Mac emulation.

Emplant allows Amiga disk drives to read Mac disks in either A-Max or Emplant format. Connecting an Amiga high-density drive allows Emplant to read and write high-density Mac disks, but not the more common low-density (also called double-density) disks. To use low-density Mac disks, you need to connect Sybil, the Utilities Unlimited disk interface (sold separately for $99.95). This is currently the biggest drawback in re-creating a genuine Mac within a multitasking Amiga. If you want to be able to use both high- and low-density disks in your Emplant system, you must have two separate pieces of hardware: a Sybil and an Amiga high-density disk drive.

The Emplant's Mac serial and parallel ports support modems, printers, and AppleTalk networks. As of this writing, the Emplant cannot use the Amiga serial and parallel ports; you must buy or build the proper connectors. You can then transfer your modem and printer cables from the Amiga to the Emplant board, but that reduces convenience, especially in a multitasking environment.

Also missing in action are Mac sound, support for the AmigaDOS devices like dh0: and RAD:, support for more than 4MB of Mac memory, and anything that resembles a functional manual. There is a booklet that barely begins to explain this complex product, and several disk files that fill in some of the holes, but this combination raises more questions than answers. Tech support is very knowledgeable (you get the actual board designers), but available only three days a week.

The Emplant compares very favorably to the A-Max II Plus, which does not support color or Amiga multitasking. The A-Max II Plus also uses the 128K first-generation Mac ROMs, while the Emplant uses the more advanced 256K ROMs, which support 16- and 256-color screens. The Emplant is not a clear winner, though, since the A-Max II Plus has a larger screen, faster screen scrolling (because it's monochrome), and built-in support for standard, low-density, 800K Mac disks.

Although the Emplant does not emulate the powerful Mac Quadra, a stock 68040 Amiga provides most of the horsepower needed to turn an A4000 and an Emplant with 256K ROMs into the virtual equivalent of a Quadra—without more expensive ROMs or an emulation upgrade. (Mac 256K ROMs cost about $250 and are available from outlets like Shreve Systems, 800-227-3971.)

Manic Mac Attack

I initially spent several frustrating days performing ROM transplants on delicate Mac innards, until a call to Utilities Unlimited tech support revealed the mystery of the ROMINFO program. It turns out that you don't have to open your Mac II and pry out the precious ROM chips. The as-yet-undocumented file ROMINFO reads the Mac chips while they are inside the Mac, and dumps them to a Mac file that you can easily send to the Amiga via modem.

I never could get the ROM dump program to work from within the Amiga (tech support claims that not all Mac II ROMs are compatible), but ROMINFO worked like a dream. Just connect your Amiga to your Mac via modem, send the ROMINFO file to the Mac, and run it. Then use your modem to send the ROM-image file it creates back to the Amiga, and you're in business.

Legal issues involved in using ROM-image files are vague, but, according to Utilities Unlimited, using such files is legitimate as long as you do not use the Mac from which they were copied at the same time as you use the Emplant. This is scarcely an undue hardship, since an Amiga with a multitasking Macintosh inside is superior in so many ways to even the best single-processing Mac.

Because so many of the Emplant's advertised features were dysfunctional upon release, users should be forewarned that this is a continually evolving product. Fortunately, fixes continue to arrive at a furious pace, and Emplant utility programs have appeared on networks such as GEnie and BIX, further lessening some consumer concerns. Call ahead before you buy, and make sure that all the features you need are available.

Big Aspirations

Future versions will include the ability to emulate a host of personal computers, like MS-DOS 386/486, Commodore 64, Atari Mega ST, Atari 400/800, and even game machines such as Sega Genesis and Super Nintendo. According to the advertising, all you need to run several computers at once is the current version of the Emplant hardware, the ROMs or ROM-image file ►

BRILLIANCE™

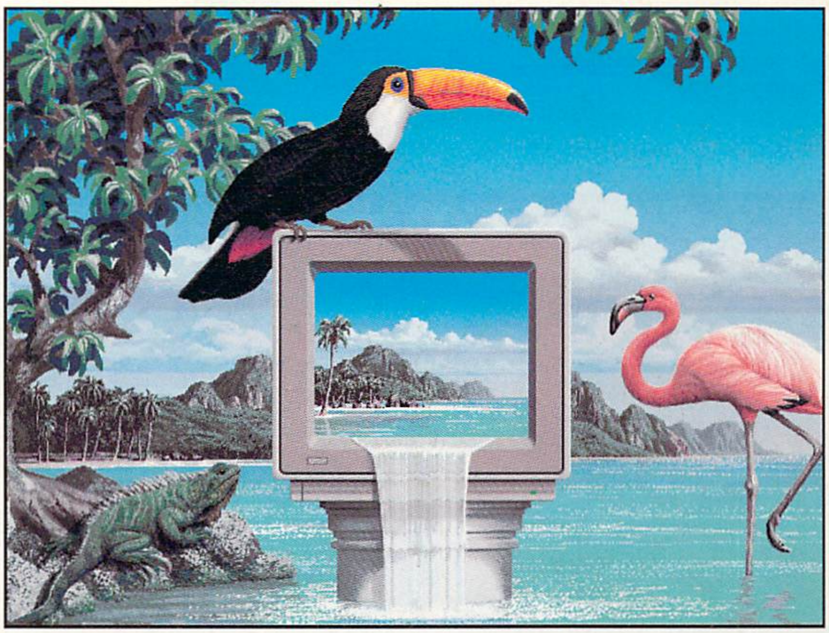
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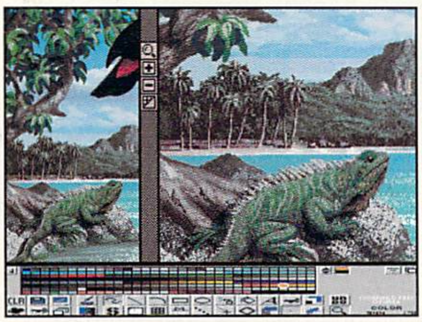
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Artwork by Jim Sachs. Created at 640x480 in 256 colors on an Amiga 4000.

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from the computer to be emulated, and new emulation software. Who knows? Maybe the Amiga will become the Anything Machine, capable of wide-reaching computer and game-machine emulation.

Any way you look at it, Emplant is an engineering marvel. Granted, it's sometimes frustrating, but if the continuing upgrades from Utilities Unlimited make the Emplant live up to its billing, the future in cross-platform computing will be bright indeed.

—Daniel Greenberg

Anim Workshop

Axiom Software, $99.95.

Creation and control of OpCode 5 ANIMations.

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2.0 or higher compatible.

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How many times have you sought precise timing of individual ANIMation frames or attempted to sync a sound to a specific spot? Ever tried to change the size or resolution of an animation after it was created? Now, by using Axiom's Anim Workshop in conjunction with ASDG's Art Department Professional, you can achieve all of the above and more.

While its name might imply otherwise, Anim Workshop does not create the individual frames that constitute your animation. Rather, the program provides an interface for manipulating the images and combining them into an Amiga IFF OpCode 5 ANIM file. ANIMs may also be of the XOR (allowing you to play them backwards) and multimedia (can contain audio synchronization) varieties. In addition, Anim Workshop can act as a batch-file converter in that it enables you to manipulate individual files and store them back as individual frame files.



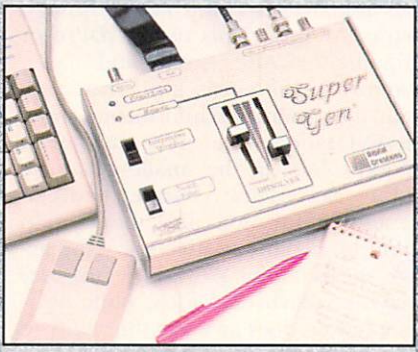
Anim Workshop's interface is clean and simple.

Installation is a simple process that utilizes a standard Commodore installation program. The user interface is comprised entirely of on-screen buttons or keyboard equivalents; there are no pull-down menus. The upper-left section of the screen is used for a file list that may contain either ANIM or picture files. Using the buttons below the list, you can add, remove, or show files. You also have buttons to sort (alphabetically) or swap files in the list. You can save the file list to disk and load it later with the List button. A picture file can be in any valid format supported by ADPro from two to 16.7 million colors. You must convert each picture to an ►

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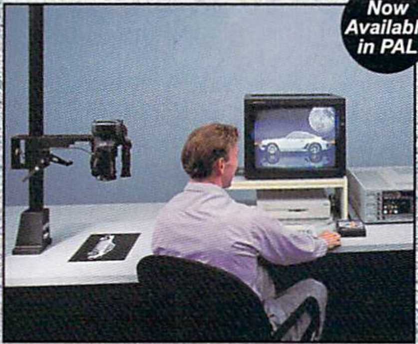
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Amiga-displayable format prior to creating the ANIM file.

Animation Manipulation

The upper right of the screen displays the information about an ANIM file, including dimensions, display mode, frame count, file size, format, and whether loop frames are included. The Enter key brings up the Animation Control Panel, where you have the expected controls such as stop, play forward/backward, fast forward, first/last frame, pause, and so on. You can play ANIMations at a selected global frame rate, or set different timings on individual frames. The panel lets you adjust viewing positions, as well as force an interlaced screen, which output to video requires. You also can set an IFF 8SVX sound file to play on any of the four Amiga audio channels at any specific frame, while controlling foreground/background priority or interrupt and volume.

With Anim Workshop, you can also separate an ANIM into individual files or smaller animations, or combine it with other animations or pictures into a complete ANIM. In addition, you can control palettes, resize, dither, delete/insert or replace specific frames, flip from horizontal to vertical, or grab frames from the screen. To execute complete image processing, you can call anything that does not have a specific button through custom ARexx scripts using ADPro or through other ARexx commands.

Anim Workshop can also create very useful histograms and information about the ANIMation, such as the number of unique colors, or the smallest, largest, and average delta (changes between frames) compression. This information is critical, because it affects actual playback speed. Anim Workshop provides hard-disk playback, which, while obviously slower, does give you the ability to view larger-than-RAM animations.

Prerequisites

The documentation is a brief 42-page booklet without an index. While it discusses the program functions, you will need to understand the concept of Amiga ANIM files, and their limitations, as well. For full utilization of this program, you will also have to know and understand ADPro loaders and savers.

On the surface, it seems that most of the same functionality provided by Anim Workshop can be found in public-domain utilities or in ASDG's FRED, a part of ADPro (which itself really is a required tool to obtain full functionality from Anim Workshop). The program's interface, however, is more intuitive than FRED's for basic ANIMation creation—although to use most of the powerful image-processing operators in ADPro, you will still need to write custom ARexx scripts. If you have this ability, you could just as easily access FRED directly from ADPro.

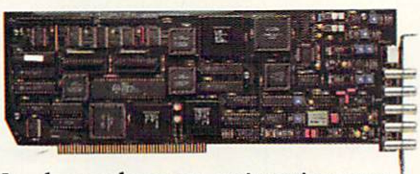
Problems . . . and Solutions!

My testbed system consisted of two 68030/28MHz-equipped Amiga 2000s, each with 9MB of RAM, and AmigaDOS 2.04, with no TSR programs. I originally tested Anim Workshop (version 1.02) and found minor problems with font display, the creation of XOR ANIM, the use of wildcards in file naming, and a few other things. After contacting technical support, I was told a few of the problems had already been fixed and a new version would soon be ready. Axiom also examined the other problems I had identified and made some additional revisions, and very shortly afterwards a new version (1.03) arrived for me to evaluate. I found that each problem had indeed

Continued on p.65.



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AW SPECIAL PREVIEW

EO TOASTER 4000

The long-awaited Toaster upgrade delivers both new hardware that takes advantage of Amiga AGA graphics and new softwareoffering greatly enhanced Toaster operations.

BY SHELDON LEEMON

EDITOR'S NOTE: The following "first-look" feature is based on a pre-release version of the Video Toaster 4000 made available especially for this review. The final release is expected to ship by the time you read this. AW will provide follow-up coverage and in-depth evaluations of the new Toaster hardware and software in future issues.

THE NEW AMIGA 4000 version of NewTek's Video Toaster should answer a lot of the lingering questions Amiga owners have had about the Video Toaster: Will NewTek stick with the Amiga or jump to IBM or Mac hardware? Will they finally make make a Video Toaster that fits in a state-of-the-art Amiga, instead of the obsolete A2000? Will LightWave users ever be able to create animations without using expensive professional video decks and single-frame controllers? Toaster users and Amiga owners everywhere are bound to like the answers that the Toaster 4000 provides.

One of the more interesting aspects of the new Toaster card is that it fits in virtually every model Amiga that has a video slot. In its default configuration, the card plugs into the A3000, A3000 Tower, A4000, or the upcoming A4000 Tower. Like a Transformer robot, however, when you shift the position of the removable BNC module, it converts to a card for the Amiga 2000. (The manual provides precise, step-by-step instructions—with diagrams and pictures—for installing the card in each Amiga model.)

Although the new card looks quite similar to the original one, NewTek does claim a number of new additions and improvements: six new effects modes, improved video output, better overlay of Amiga graphics, and hardware that is designed to mesh better with the AGA graphics chips in the Amiga 4000. ►

PHOTOGRAPH BY EDWARD JUDICE

Software Switches

New hardware, of course, isn't of much use without new software. The new Toaster 4000/Toaster 3.0 software may look quite similar to version 2.0, but it is much improved. The Switcher screen has a more professional look, with rounded buttons, better colors, and a less cluttered layout (see Figure 1). Its interface has also been improved. Whenever a button offers a large number of choices, for example, it pops up a scrolling menu, rather than making you flip through selections one at a time. And on wipe effects, you can now set the duration in frames (1/30th of a second), instead of being stuck with Slow, Medium, and Fast speeds.

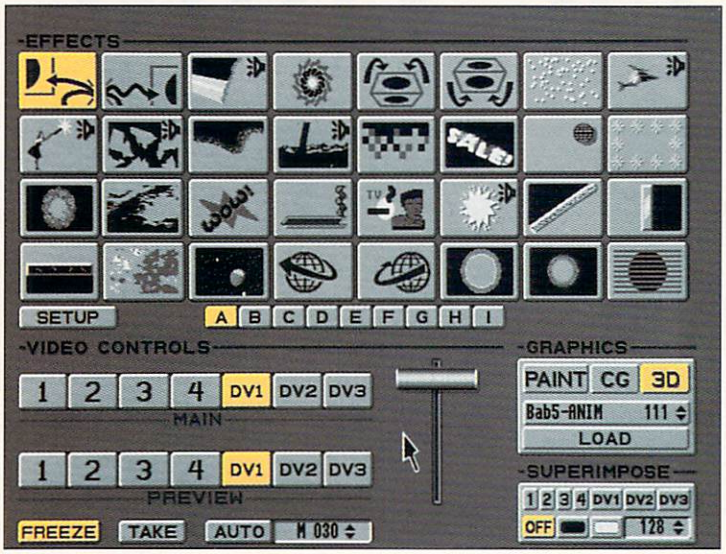


Figure 1. Switcher: The Switcher module sports a cleaner, less-cluttered look. It's also picked up the ability to display LightWave animations as well as still frames—not to mention dozens of new effects.

The real news, however, is the extent to which the Switcher takes advantage of the A4000's AGA graphics chips. One of the greatest strengths of the Amiga 4000 is its ability to play 262,000-color animations at 30 frames per second. The Toaster 4000 takes advantage of this ability by allowing you to render HAM8 animations directly from LightWave 3D. You can now load and display these files right from the Switcher screen, just as you load and display still frames.

The quality of the A4000's 18-bit color display isn't quite as good as the Toaster's own output, but even so, it is often indistinguishable from high-quality video. Most video makers should find it of sufficient quality for a wide range of uses. With a full 18MB of RAM installed in the A4000, you can play six seconds of animation—enough for most logo sequences, for example. Longer animations will be possible if you add a 32-bit memory expander such as the upcoming DKB 3128 (DKB Software), which can hold 128MB more RAM.

The Switcher also uses AGA graphics in its new video effects. Toaster 2.0 Action F/X used moving silhouettes, but Toaster 4000 effects include full-color moving figures, some with transparent drop shadows. In one effect, for example, the ubiquitous Kiki Stockhammer walks in from the side of the screen, waves a magic wand, and the picture changes in a flash of light (see Figure 2). Other effects make extensive use of LightWave animations: to fly the word "SALE" around with trails, to crash a spaceship through the picture, and to superimpose an animation of life-like swinging wedding bells in a corner of the screen.



Figure 2. The Toaster 4000's new Switcher takes full advantage of AGA graphics to provide a whole array of new video effects—such as the one above in which Kiki is about to disappear in a flash of light.

AGA graphics even come in handy for still images. In effects where multiple layers of graphics are needed, the A4000's display adds a third high-color source to the Toaster's own two internal framebuffers. There is a category of effect, for example, that uses AGA graphics to superimpose a frame or border around the screen, such as a picture frame or a set of marble columns.

NewTek has also improved many existing effects. Although the new Toaster does not compress video any better than the old version, the increased video bandwidth of the A4000 allows for noticeably faster effects and smoother transitions. Effects like page peels and flys are dramatically more professional than they were before. In effects like the Rotating Cube, transparent drop shadows provide an extra touch of realism.

Some effects not only look better, but sound better. For example, the Glass Shatter effect is now accompanied by the sound of breaking glass, while Pour In adds the sound of water pouring; several of the new effects also have sound to go with them. Not only has the quality of the effects changed, but so also has the quantity. The Switcher now sports nine panels of 32 effects each, for a total of nearly 300 effects loaded at a time.

A CG With Character

The Switcher changes are flashy, but the improvements to the Character Generator program may have an even more lasting impact. The CG is a program that video makers use constantly, and it has gotten a complete overhaul (see Figure 3). The interface, which had used

the keyboard exclusively, now features complete mouse control. Not only can you use the mouse to select text placement, but also you can drag text and graphics elements to any position on the screen. You can even overlap them, with variable degrees of transparency.

Freeing the CG from its keyboard control has removed most of the restrictions. You can now change the size, color, border, and shadow of each character individually. And no longer are you restricted to a fixed list of sizes. The Toaster CG now reads both PostScript fonts and Compugraphic outline fonts, in addition to its own bitmap format. These new fonts can be scaled to the point where a single character fills the screen. There is no longer a set number of fonts that can be loaded at once—a good thing because the package comes with more than 300 fonts. You are now limited only by memory.

The most exciting change to the CG, however, is the introduction of graphics clips into the title page. You can load virtually any brush file into the CG, and place it wherever you wish on the screen. In addition, there is a built-in "box" brush, which can be dragged out to any size you wish to create background boxes and separator bars. Both text and brushes have individual alpha-channel transparency settings, which means that you can layer them transparently over live video, as well as over each other. These features allow you to create the same kind of bottom-third graphics that you see on network TV, where, for instance, baseball scores are set over semi-transparent boxes, with the NBC peacock off to one side.

LightWave Moves Light Years Ahead

If you think that the Switcher and CG have changed, then wait until you see LightWave and Modeler. LightWave 4000 has more than 250 new features, and almost every one of them is a major improvement. Just listing them would take an entire article, but a few deserve special mention. The entire user interface has been made simpler, yet much more powerful. All of the controls have been consolidated onto the Layout screen (see Figure 4), so there is no more switching back and forth from Layout to control screens (and no more losing your layout because you forgot to set a keyframe). Motion paths are now visible and can be changed interactively. There are powerful new controls for moving and scaling sections of the animation: You can view the scene from the vantage point of a light, move easily from one frame to another via sliders, and save and load preview animations.

There are many rendering improvements as well. Rendering has been optimized for the 68040 processor and now operates up to ten times faster. True antialiasing makes your scene look good even when rendered at lower resolutions. Camera effects such as lens flare, motion blur, and depth of field have been added. Shadow mapping allows you to create soft-edge shadows much more quickly than ray tracing. Cubic and Front Projection image-mapping modes provide easier and better ways to wrap pictures around objects. Deformation maps can be used to change the shape of objects. A system of "bones" allows you free-form deformation of objects—especially good for character animation in which objects stretch and twist as they move. You now can morph not only objects, but also their surfaces. Best of all, you now render HAM8 versions of you animations directly to hard disk for real-time playback through the Switcher.

The Modeler program (see Figure 5) has almost as many new features as LightWave itself. Create a text object, for example, merely by typing text and selecting one of the same PostScript fonts used by the CG. A bevel tool allows you to bevel text (or any other object) automatically. Boolean functions allow you to combine objects, create an object from the intersection ►

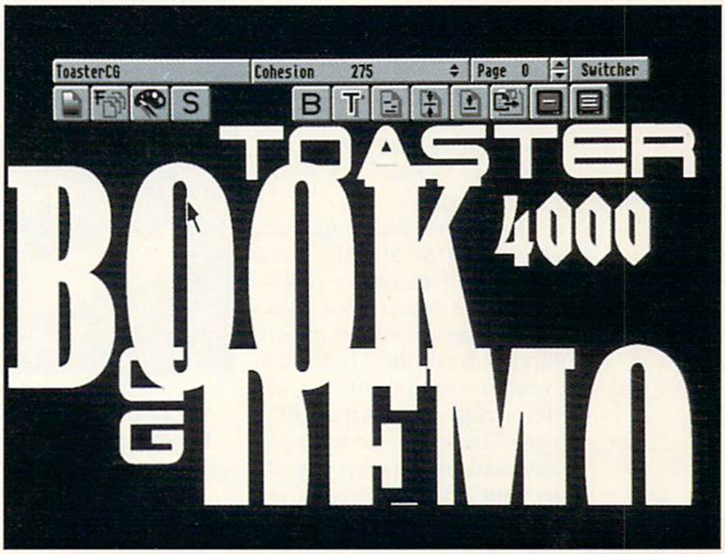


Figure 3. CG: The Character Generator has received a complete overhaul. It can now generate text at any size from PostScript fonts. Text and graphics elements can be dragged to any position (even overlapping) using the mouse.

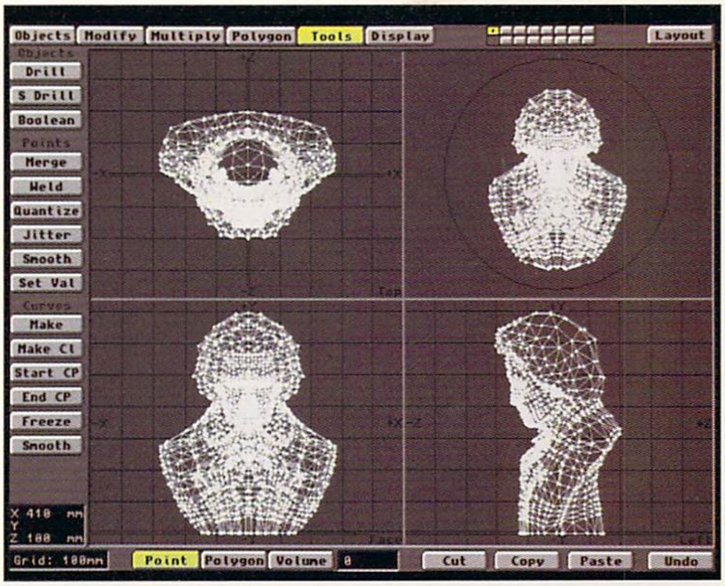
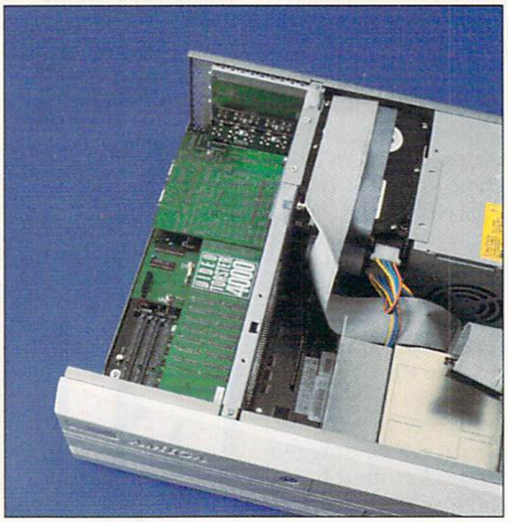


Figure 4. LightWave: More than 250 new features have been added since 2.0. All of the LightWave controls have been consolidated on the Layout screen—making it much easier to maneuver around the program.

of objects, or use an object to punch a hole through another object. The Drill and Solid Drill tools let you create holes with sides. The new Modeler 4000 also now allows you to use spline curves to create objects.

In addition, you can now view a LightWave image in the Modeler and trace over it. You can extrude an object over a motion path or spline curve, and you can modify an object's shape with Taper, Sheer, Bend, and Magnet tools. Use Quantize to snap points to a grid, Merge to eliminate duplicate points, Smooth to reduce jaggedness, and Jitter to randomly rough up an object.



The new Video Toaster 4000 installs directly into the A4000 (above) and the A3000, and—with an adjustment of the BNC module—into the A2000 as well.

One of the more important changes to the Modeler is the addition of extensive ARexx support. A Macro tool allows you to run an ARexx macro directly from the Modeler to create or modify objects under program control. One macro included, for example, automatically creates the objects for a 3-D bar graph from Pro Calc spreadsheet data.

Getting Up to Date

For all of the changes and improvements, the suggested list price of the new Toaster 4000 hardware and software package has actually gone down $100, to $2395. Although final details are not yet available, NewTek states that there will be a number of upgrade plans for current Toaster owners. A software-only upgrade will cost $795 (although it appears at least for now you will need an accelerator and math coprocessor). If you wish to get the new Toaster hardware, you can either send in your old board and $1195, or keep your old board and "double up" for $1795 (i.e., you get new software for your old board, plus the new 4000 card with its software).

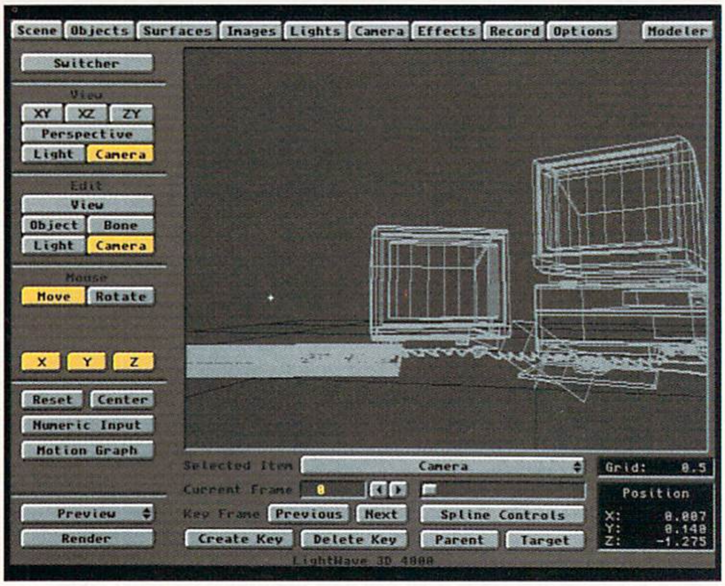


Figure 5. Modeler: The Modeler sports a whole new set of power tools, including Drill and Boolean operators.

Commodore is also making it easier to upgrade to an Amiga 4000, with a "power-up" plan whereby A2000 owners can buy an A4000/30 for $1599 or an A4000/040 for $2349. In addition, through a joint promotional effort with NewTek, CBM is offering a $100 rebate on the purchase of an A4000 to anyone buying the Toaster 4000. This should be a tempting proposition, since A2000 and A3000 owners who upgrade their software, but not their computers, will miss out on some of the new Switcher features that rely on AGA graphics. Although NewTek has not yet shipped the non-A4000 version of the 3.0 software, preliminary illustrations in the manual suggest that this version will have only seven banks of effects instead of nine. And unlike the A4000 version, obviously it will not be able to play back HAM8-mode animations.

Also, if you're using a 1960 monitor, you may need to switch to a 1084—at least temporarily. The current VGA-style adapter plug that Commodore ships with the A4000 does not work with the Toaster. A revised model may be available later, but for now the 1084 is the only recommended monitor for the Toaster 4000.

It's a Wrap

While not every part of the Toaster has been updated (e.g., ToasterPaint and Chroma/FX), the changes are so substantial that it appears NewTek is making good its pledge to renew the Toaster revolution every year.

The company also indicates the kind of improvements that we may expect in the future. NewTek has stated its intention not just to update ToasterPaint in the near future, but to completely replace it with a ground-breaking paint system. It has hinted that audio digitizing may also be added. There has been widespread speculation, as well, about the Toaster becoming the heart of a non-linear system in which video could be edited and played back directly from hard disk. Considering NewTek's accomplishments so far, it seems likely that the company will eventually fulfill all of these expectations. In the meantime, however, the Toaster 4000 system is a definite "must-have" upgrade for every serious Toaster user. ■

Sheldon Leemon, a computer/video consultant and instructor, is the author of two books and scores of magazine articles covering the Amiga. He recently became Forum Manager for the Amiga area on the National Videotex Network.



ILLUSTRATED BY EARL KELENY

A Command of LANGUAGES

Whether you're an old hand or a novice,

goals should determine which programming language you use.

To choose among the dozens of options available, however, you need

a good command of languages.

Programming is not just programming. Some languages are best suited for learning, some for creating macros. Some are geared toward large project development, some for mathematical analysis. This means that the job should, as often as possible, dictate the tool.

EVERYTHING A LANGUAGE SHOULD BE

The language itself is not the only issue to consider. The particular implementation of the language, supplied tools, and support are also concerns.

The main difference in implementation is the question of an "interpreted" versus a "compiled" language. Interpreters operate slowly, executing one line of code at a time, but they interact directly with you, offering instant feedback, protection from errors, and built-in debugging. Programming is generally easier in an interpreter.

Traditional compilers (and assemblers) translate an entire source program into executable code (i.e., machine-language) before any instruction is executed. This usually results in a "stand-alone" program that can exist apart from the language system.

The translation into machine code makes compiled programs run fast, but difficult to debug. Good compilers offer some kind of debugger. A few establish a workspace much like an interpreter's, compiling one statement or function at a time. Some can integrate with a text editor to provide a seamless edit-compile-debug loop similar to an interpreter.

Most languages can hook into Amiga libraries, and thus use AmigaDOS functions; they may also provide additional linker libraries. If there's a language standard, support is an advantage. Examples and manuals are important, and help features and support are nice. ►

BY DAVE HAYNIE

To see how 19 commercial Amiga languages compare, refer to the table entitled "Codes of Conduct," on pages 32-35. Throughout the rest of the article, we'll focus individually on the languages and packages listed there, plus freeware languages (see the sidebar "Free 'Speech'") and a couple from overseas (see the "Swiss Please" sidebar).

The table and writeups reflect the results I got testing each package under AmigaDOS 2.1 and 3.0 along with Enforcer, a utility that determines how well they follow Commodore guidelines. *(To locate the vendors of languages presented here, see the "Manufacturers'/Distributors' Addresses" list on p. 94.)*

AREXX

ARexx is in a class by itself. It comes with the AmigaDOS 2.x or 3.x, and is available separately (complete with interfacing samples, programs, and a manual) from ***William Hawes*** ($49.95). The language excels at linking programs and building new tools from existing ones. Cooperating programs make a set of functions available to ARexx, allowing for "remote control." Further, any ARexx program can access the exported functions of a host of applications. Professionals can also use ARexx for quick prototyping.

ARexx supports dynamic strings with pattern matching, recursive functions, and routines for dealing with command passing. You can use ARexx to program the Amiga directly (via shared libraries), though inefficiently compared to other languages.

THE ASSEMBLY LANGUAGES

Assembly, the native 680x0 CPU's language, is suited to things that cannot be done quickly or efficiently enough in higher-level languages. Some programmers swear by it, others find it time-consuming or unmanageable for large projects.

ASSEMPRO

AssemPro ($99.95, ***Abacus***), is an integrated system. The assembler works from the editor or disk. You can make changes in the screen editor, and edit files in separate windows. The assembler generates 68010 code, but nothing more advanced, and it's not fast. It produces executables in memory, which you can save, but there's no linking phase for modular coding. The debugger can load a program (from disk) and transfer symbols from the assembler. It handles basic breakpoints and single or slow stepping. Help files for 1.3 Amiga library function register conventions are included.

AssemPro is outdated, has trouble with 2.x/3.x windows, and generates lots of Enforcer hits. Its few good features aren't developed enough to offer advantage.

DEVPAC 3

Devpac 3 ($110, ***HiSoft***), another integrated assembler, comes on four disks (two for 1.3 and two for 2.x/3.0) with assembler, editor, debugger, linker, utilities, and include files. It supports all instructions for 68000 through 68040, plus 68881, 68882, and 68851.

Devpac 3 is compatible with standard Amiga assemblers, and it supports both pre-assembled and standard headers. It produces executable, object, and Motorola S-Record output. The editor integrates nicely with the assembler and debugger, and supports multiple files, clipboard cut and paste, macros, and more. The full-featured symbolic debugger offers complex breakpoints, stepping, various load and save options, and source-line import from from compilers.

I recommend Devpac 3 highly. Because most compilers offer assembly support, it might be overkill for compiler users. Advanced development may also require direct FPU (floating-point unit) or supervisor-level assembly code, which is lacking in many assemblers. Devpac 3's only flaw is a lack of much demo code, though this is easily found in the public domain.

THE BASIC LANGUAGES

Beginner's All-purpose Symbolic Instruction Code comes in many forms. Traditional BASIC is interpreted and run only from an integrated environment. Most BASICs store programs in binary form, where commands are "tokenized" for compact storage and execution. All those I examined have the basic modern control structures, some subprogram facility, and long variable names with local/global scoping control. Typically, BASIC has dynamic string variables, which are easier to use (but generally slower) than fixed-length strings.

Commodore's **Amiga Basic** was included with Amiga systems before the A3000, but is not available by itself. Other BASICs have more features, better structures, and more current support, and several packages extend Amiga Basic.

A/C BASIC

A/C BASIC 1.3 ($195, ***Absoft***), an Amiga Basic compiler, takes programs in ASCII rather than tokenized format, so you can use it without Amiga Basic's interpreter. Its manual describes the language completely.

A/C BASIC adds recursive subroutines, static arrays, and other compiler-specific features to Amiga Basic. Its stand-alone results run much faster than under Amiga Basic, and seem to work fine on the A3000/A4000. The compiler has trouble with 2.x/3.x windows, however, and installation is not very flexible. It's good for Amiga Basic users, but not for much beyond that.

AMOS

AMOS (***Europress Software***) is a tokenized BASIC interpreter that emphaszes graphics and animation. There are three versions: **Easy AMOS** ($50), **AMOS The Creator** ($99.95), and **AMOS Professional** ($99.95). I examined the latter two. (For a review of Easy AMOS, see Dec. '92, p. 22.)

The Creator 1.3 comes on three disks and Professional 1.12 on six. The manuals do not teach programming, but they're good references. The Creator's editor is driven by gadgets; Pro provides an enhanced editor with menus. The editor knows the language and can check syntax interactively. It also supports subroutine folds, a help system, and tools written in AMOS.

Both versions support a decent structured BASIC, with recursive procedures. The hundreds of commands allow high-level access to screens, graphics, menus, windows, sprites, blitter objects, sounds, and so on. There's a language for animation, and in Professional, a GUI (graphic user interface) language. A set of functions hook into AmigaDOS libraries and structures (AMOS

does not support data structures directly). One add-on module provides new BASIC commands; another provides 3-D object control and an object editor. An optional compiler adds commands for startup and compiling, and produces faster, stand-alone programs.

AMOS is easy to use and has advanced capabilities for game and some multimedia programming, but it needs better support of the Amiga standards, and has some bugs. While The Creator started up on a 68040, some functions caused crashes. The compiler doesn't support Professional's system enhancements (these are scheduled for summer release), and too often fails on '040 systems. And while Pro works on an '040, it caused Enforcer hits with many examples.

Blitz BASIC 2

Blitz BASIC 2, 1.0 ($99.95, ***Acid Software***) is an integrated BASIC compiler. Its two disks contain the editor, compiler, libraries, and examples. The editor knows BASIC and highlights keywords. You can compile and run programs from the editor without disk I/O, maintaining some of the feel of an interpreter. The compiler is fast, and supports a simple post-mortem source-level debugger.

Blitz is a good structured BASIC. Features include recursive functions/subroutines and a rich set of types: byte, word, long, fixed-point, single-precision floating-point, dynamic strings, fixed arrays, dynamic lists, pointers, and user-defined. Unlike most compilers, Blitz does not require you to declare non-array variables before using them, though you must specify their types initially. Most built-in commands are closely aligned with AmigaDOS structures.

Blitz handles interrupt routines, copper lists, or direct assembly language. Interestingly, assembly is a subset of Blitz. You can build extension modules to add commands. Blitz Mode shuts down AmigaDOS and runs under Blitz library functions.

The compiler isn't great at identifying some problems, and a few examples failed on the 68040, though apparently Acid is readying a fix. Blitz is fast, sophisticated, and suited to games. A newsletter is available.

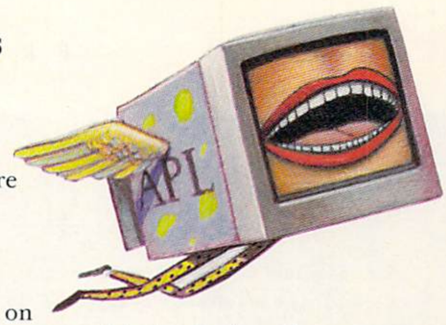
F-Basic

F-Basic 5.0 ($99.95, ***Delphi Noetic***) is an advanced, compiler-only system. Three disks contain compiler, editor, linker, debugger, and examples. Its manual teaches F-Basic, but not programming. Library functions access 1.3, 2.x, and 3.0 routines.

F-Basic requires stricter structuring than most BASICs. You must declare all variables, including maximum string lengths, though dynamic strings are not supported. Numbers of several sizes, floats, pointers, and user-defined types are available too. It supports a very powerful Pattern data type for text-enhanced processing. Along with recursive procedures and functions, F-Basic supports overloaded user-defined operators. It comes with a decent set of functions for AmigaDOS, matrix, and event-trap processing.

You can create F-Basic programs with any text editor, though the simple FEd gives an integrated feel. It can compile in memory or to disk, and supports linking for multifile projects or stand-alone programs. The compiler can optimize for 68020–68040 processors, and can generate in-line FPU code.

F-Basic does not have a huge built-in library, but it's the most professional BASIC system, equivalent to C or Modula-2, and in some places more powerful.



Power BASIC

Power BASIC 1.06 ($72.99, ***HiSoft***) comes on one bootable disk. It is a superset of Amiga Basic, and is highly compatible with MicroSoft's QuickBASIC 3.

The integrated editor/compiler opens from Workbench to a window limited to 640x512 or so. You can edit in ASCII within the simple Power BASIC editor or another. The integrated system delivers some of the feel of interpretive BASIC. Programs compiled with Power BASIC run on 68030s and '040s.

This is a good system for upgrading Amiga Basic, or for transporting BASIC programs from Macs or PCs (the manual details translating). The compiler crashed on a 68040 with the caches on, but worked fine without caches (compiled programs work fine with). Power BASIC programs require the hisoftbasic.library to run. An enhanced version, called HiSoft BASIC, is fully Power BASIC compatible, extensible, and produces true stand-alone programs.

True BASIC

True BASIC Student Edition 2 ($19.95, ***DevWare***) is a traditional structured system. Its manual teaches programming, but leaves out some features, including true modularization mechanism (a full reference is available).

True BASIC supports most modern language constructs, though it sticks with rather simple typing—numbers and dynamic strings only. Its graphics system works independently of computer platform.

While you can use any text editor, the built-in editor allows interactive compilation. Programs can be compiled from within the environment for extra speed.

True BASIC doesn't have the extensive libraries of other BASICs, but DevWare sells a series of instructional mathematics packages for it. It had a few problems with the 68040, but no trouble on other systems.

The Niklaus Wirth Languages

Niklaus Wirth is famous for Pascal, which remains popular for teaching structured programming. To answer its deficiencies, he developed Modula-2; it allows for managing modules and associated abstract data types, as well as procedure variables and low-level facilities for machine-specific jobs. Finally, Wirth created the streamlined Oberon, which incorporates fully abstract data, or objects. (See the sidebar "Swiss Please" for an Oberon and a second Modula-2 package.)

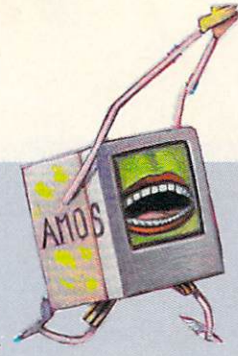
HighSpeed Pascal

HighSpeed Pascal 1.10 ($147.99, ***HiSoft***) includes a compiler, integrated editor, and library support units. Versions for 1.3 and 2.04 are provided. The compiler strives for Turbo Pascal compatiblity, and approaches the ISO standard. It supports program units (equivalent to modules in Modula-2), pointers, "typeless" parameters, macros, and other features required for ser ious development. It handles in-line assembly very ►

Codes of Conduct

It's no easy task to compare languages side by side. They don't all exist for the same purpose and they don't all support the same features. Besides, you can accept limitations in a $20 package that are unacceptable in a $200 language. Still, I came up with a number of useful categories. In each case, I consider what comes with the package and the manufacturers' options, not necessarily what's possible via extension. Languages that provide enhancements to AmigaDOS in terms of easy-to-

	A/C BASIC	Amiga Basic	Amiga Logo	AMOS Creator	AMOS Pro	L1 APL 68000	L2 APL 68000	ARexx	Assem-Pro	Bench-mark M2
Manufacturer	Absoft	CBM	CBM	Europress	Europress	MicroAPL	MicroAPL	W. Hawes	Abacus	Armadillo
Price:	$195	N/A	$99.95	$99.95	$99.95	$155; $415	$495	$49.95	$99.95	$200-500
Memory required:	512K	512K	512K	512K	1MB	512K	512K	512K	512K	512K
SYSTEM OVERVIEW:										
System Type:										
Compiler	Yes	No	No	Yes:O	Yes:O	No	No	Yes:O	No	Yes
Interpreter	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Assembler	No	No	No	Yes:O	Yes:O	No	No	No	Yes	No
Interface:										
CLI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Workbench	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
ARexx	No	No	No	No	No	No	No	—	No	E
Editor	No	F	F	F	G	F	F	No	F	G
Integrated	No	G	G	G	E	Yes	Yes	No	F	Yes
User Level:										
Educational *	G	G	E	G	E	E	E	G	P	F
Advanced	F	F	F	F	G	E	E	E	F	G
Pro developer	P	P	P	P	F	F	F	E	F	G
Pro scientific	P	P	P	P	P	E	E	G	P	P
EXECUTION/CODE:										
Production:										
Stand-alone	Yes:L	No	No	Yes:L	Yes:L	Yes:OL	Yes:OL	No(4)	Yes	Yes
Executable	Yes	No	No	Yes:O	Yes:O	No	No	Yes:O	Yes	Yes
ROMable	No	No	No	No	No	No	No	No	Yes	Yes
Object code	No	No	No	No	No	No	No	No	No	Yes
Optimizer	No	No	No	No	No	No	No	No	—	No
68020+	No	No	No	No	No	No	No	No	No	No
Floating-Point:										
Custom/unspecified	Yes	Yes	No	Yes	No	Yes	Yes	No	—	No
FFP.library	No	No	Yes	No	Yes	No	No	No	—	Yes
IEEE.library	No	No	No	No	Yes	No	No	Yes	—	No
Direct FPU	No	No	No	No	No	No	Yes	No	No	No
LANGUAGE FEATURES:										
Standard	Yes(3)	Yes(3)	Yes	No(3)	No(3)	ISO	APL2	Yes	No	Yes
Data Types:										
Typing	M	M	W	M	M	W	W	W	W	S
Lists	No	No	G	No	No	F(10)	F(10)	No	—	No
Arrays	P	P	No	G	G	E	E	No	—	P
Text	G	G	G	G	G	G	G	E	—	F
User-defined	No	No	No	No	No	No	No	No	—	E
Subprograms:										
Macros	No	No	No	No	No	No	No	No	Yes	No
Line	Yes	Yes	No	Yes	Yes	No	No	No	Yes	No
Procedures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Functions	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
Operators/overload	No	No	No	No	No	No	Yes	No	No	No
Recursion	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Level:										
Structured	Yes	Yes	No	Yes	Yes	No	No	Yes	No	Yes
Modular	No	No	No	No	No	No	No	No	No	Yes
Object-oriented	No	No	No	No	No	No	No	No	No	No



use library functions get special note. When a feature is significant, I give it a grade scaled in relation to the other languages presented. Please keep in mind that such ratings reflect my opinion, and that languages can be as personal as any other issue; just because I don't like something doesn't mean you won't fall in love with it.

See the key on pp. 34-35 for an explanation of the rating symbols.

	Blitz BASIC	Comeau C++	Devpac 3	F-Basic	A/C Fortran	HiSpeed Pascal	J-Forth Pro	Power BASIC	SAS/C	True BASIC
Manufacturer	Acid	Comeau	HiSoft	Delphi	Absoft	HiSoft	Delta	HiSoft	SAS	DevWare
Price:	$99.95	$250	$110	$99.95	$295; $495	$149.99	$179.95	$72.99	$395	$19.95
Memory required:	1MB	2MB	512K	512K	512K	1MB	512K	512K	1MB	1MB
SYSTEM OVERVIEW:										
SYSTEM TYPE:										
Compiler	Yes	Yes(1)	No	Yes	Yes	Yes	Yes(2)	Yes	Yes	Yes
Interpreter	No	No	No	No	No	No	Yes(2)	No	No	Yes
Assembler	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No
INTERFACE:										
CLI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Workbench	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
ARexx	No	No	No	No	No	No	No	No	Yes	
Editor	F	No	G	F	No	G	G	F	G	F
Integrated	G	No	G	G	No	E	G	F	G	G
USER LEVEL:										
Educational *	G	P	P	G	P	G	F	G	F	E
Advanced	G	G	E	E	F	E	E	F	E	G
Pro development	G	E	E	G	F	E	E	P	E	F
Pro scientific	P	F	P	G	G	F	G	P	F	F
EXECUTION/CODE:										
PRODUCTION:										
Stand-alone	Yes	Yes(1)	Yes	Yes	Yes:L	Yes	Yes	Yes(14)	Yes	Yes:O
Executable	Yes	Yes(1)	Yes	Yes	Yes	Yes	Yes	Yes(14)	Yes	Yes:O
ROMable	No	see(1)	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Object Code	Yes	Yes(1)	Yes	Yes	Yes	Yes	No	No	Yes	No
Optimizer	No	see(1)	Yes	No	Yes	No	No	No	Yes	No
68020+	No	see(1)	Yes	Yes	Yes	No	No	No	Yes	No
FLOATING-POINT:										
Custom/unspecified	No	see(1)	No	Yes	Yes	Yes	No	Yes	Yes	Yes
FFP.library	Yes	see(1)	No	No	No	No	Yes	No	Yes	No
IEEE.library	No	see(1)	No	Yes	No	No	Yes	Yes	Yes	No
Direct FPU	No	see(1)	Yes	Yes	Yes	No	No	No	Yes	No
LANGUAGE FEATURES:										
Standard	AT&T	3.0	Yes	No(3)	ANSI	Yes	Yes	Yes(3)	ANSI	No(3)
DATA TYPES:										
Typing	S	S	W	S	M	S	W	M	S(8)	M
Lists	F	No	—	No	No	No	No	No	No	No
Arrays	F	P	—	G	P	P	P	P	P	G
Text	P	G	—	E	P	G	P	F	G	G
User-defined	G	E	—	E	G	E	G	No	G	No
SUBPROGRAMS:										
Macros	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No
Line	Yes	No	Yes	Yes	No	No	No	Yes	No	Yes
Procedures	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Functions	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Operators/overload	No	Yes	No	Yes	No	No	No	No	No	No
Recursion	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LEVEL:										
Structured	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Modular	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes(9)
Object-oriented	No	Yes	No	No	No	No	Yes	No	No	No

►

	A/C BASIC	Amiga Basic	Amiga Logo	AMOS Creator	AMOS Pro	L1 APL 68000	L2 APL 68000	ARexx	Assem-Pro	Bench-mark M2
SUPPLIED INTERFACES:										
GRAPHICS										
Animation	G	G	No	E	E	No	No	OS	OS	OS
IFF	OS	OS	No	F	E	No	No	OS	OS	G:O
Intuition/GUI	F	F	No	F	E	F	F	OS	OS	G:O
2-D Drawing	G	G	G	E	E	F	F	OS	OS	OS
3-D Drawing	No	No	No	G:O	G:O	No	No	No	No	No
SOUND										
Simple	F	F	—	E	E	G	G	OS	OS	OS
IFF	OS	OS	No	G	E	No	OS	OS	OS	OS
Tracker	No	No	No	Yes	Yes	No	No	No	No	No
MIDI	No	No	No	No	Yes	No	No	No	No	No
OTHER										
OS/library calls	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes
Amiga interface	No(15)	1.3(15)	No	1.3	2.x	1.3	1.3	No	1.3(15)	1.3(7)
Call to assembly	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	—	Yes
Call from assembly	No	No	No	No	No	No	No	Yes	—	Yes
ARexx	OS	OS	No	OS	Yes	No	No	—	OS	OS
Event trapping	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
TOOLS/SUPPORT:										
DEBUGGER										
Type	No	ENV	No	ENV	RDB	ENV	ENV	ENV	RDB	RDB
Trace	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Breakpoint	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Variable	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expression	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
Source	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
INSTALLATION										
Automated	No	No	No	Yes	Yes	No	No	No	No	No
Floppy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flexible	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
HELP/LEARNING										
Manual	G	G	F	G	E	G	G	G	F	G
Tutorial	Yes	No	G	G	G	F	F	No	No	F
On-line help	No	No	F	G	E	P	P	No	P	No
Extra tools	No	No	No	G	E	No	No	Yes	No	G
Example code	Yes	Yes	F	G	E	P	P	F	F	E
Phone/FAX	Yes	No	No	Yes(GB)	Yes(GB)	Yes:O	Yes:O	—	No	Yes
Vendor BBS	Yes	No	No	No	No	No	No	No	No	No
Other support	No	No	No	M	M	C(GB)	C(GB)	No	No	No
User SIG	No	No	No	Yes	Yes	Yes	Yes	No	No	No

Key:

* Both beginners' languages and languages well suited to teaching get high marks here.

OS Provided by Amiga operating system interface only (any language supporting AmigaDOS calls can use this level of interface).

— Unknown or not applicable to this package/language.

E Excellent

G Good

F Fair

P P

S Data typing is strong

M Data typing is moderate

W Data typing is weak

ENV Debug features are mainly consequence of the interpretive environment.

RDB Separate run-time debugger provided.

PDB Separate post-mortem debugger provided.

:O Available as an option purchased separately.

:L Run-time distribution requires licensing.

GB England

CH Switzerland

C Courses offered; contact developer for details.

D Extra example disks

L Newsletter available; contact developer.

M Freely redistributable disk "magazine"; contact developer.

1 Requires a C compiler and ARexx. Some functions depend on compiler. Source-level debugging supported with SAS/C. Amiga interface support via C, no Amiga class library available yet.

2 Incremental compiler, exhibiting features of both interpreter and compiler.

3 There is no true BASIC standard, though Amiga Basic is the effective standard. All these languages are recognizable as BASIC, and it's usually easy to convert to them from Amiga Basic.

	Blitz BASIC	Comeau C++	Devpac 3	F-Basic	A/C Fortran	HiSpeed Pascal	J-Forth Pro	Power BASIC	SAS/C	True BASIC
SUPPLIED INTERFACES:										
GRAPHICS:										
Animation	E	OS	OS	G	OS	OS	Yes	G	OS	F
IFF	G(12)	OS	OS	F	OS	OS	Yes	OS	OS	G
Intuition/GUI	G	OS	OS	E	OS	OS	Yes	F	OS	G
2-D Drawing	G	OS	OS	G	OS	E	Yes	G	OS	G
3-D Drawing	F(12)	No	No		No	No	No	No	No	No
SOUND:										
Simple	G	OS	OS	G	OS	OS	OS	F	OS	G
IFF	G	OS	OS	F	OS	OS	OS	OS	OS	OS
Tracker	Yes	No	No	No	No	No	No	No	No	No
MIDI	Yes(12)	No	No	No	No	No	No	No	No	No
OTHER:										
OS/library calls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Amiga interface	2.x(13)	see(1)	3.0(15)	3.0	1.3	2.x(15)	2.x	1.3(15)	2.x(15)	2.x
Call to assembly	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Call from assembly	Yes	Yes	—	Yes	Yes	Yes	Yes	No	Yes	No
ARexx	Yes(12)	OS	OS	Yes	No	OS	Yes	OS	OS	No
Event trapping	Yes	Yes(1)	OS	Yes	No	Yes	No	Yes	Yes	Yes
TOOLS/SUPPORT:										
DEBUGGER:										
Type	PDB	RDB(1)	RDB	RDB:O	RDB	RDB	ENV	No	RDB	ENV
Trace	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Breakpoint	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Variable	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Expression	Yes	Yes	No	No	No	No	Yes	No	Yes	Yes
Source	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
INSTALLATION:										
Automated	No	Yes	No	No	No	No	Yes	No	Yes	No
Floppy	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flexible	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes
HELP/LEARNING:										
Manual	G	G	E	G	F	E	G	G	E	E
Tutorial	No	No	No	No	No	No	F	F	No	E
On-line help	No	No	No	No	No	No	No	No	E	F
Extra tools	No	P	G	P	F	F	G	No	G	No
Example code	E	No	P	G	G	F	G	F	G	E
Phone/FAX	Yes	Yes	Yes:O	Yes	No	Yes:O	Yes	Yes(GB)	Yes	No
Vendor BBS	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No
Other support	D,L	C	No	No	No	No	No	No	No	No
User SIG	No	Yes	No	No	No	No	Yes	No	Yes	No

4 ARexx programs require ARexx to run; because ARexx is built in to AmigaDOS versions 2.0 and later, they are functionally stand-alone on 2.x/3.x systems.

5 The basic package was very easy to install, but the add-on packages didn't install correctly.

6 The A/C BASIC compiler and the Amiga Basic interpreter support the same BASIC language.

7 Comes with AmigaDOS 1.3 support only. Workbench 2 definition modules due from Armadillo in late '93; 2.04 available now from Aglet Software, PO Box 3314, University Station, Charlottesville, VA 22903.

8 SAS/C is by default strongly typed, but compiler options allow it to support the moderate type enforcement typical of pre-ANSI C languages.

9 Some True BASIC (Student Edition) constructs are included in the language, but not discussed in the manual.

10 APL doesn't implement lists in the classic LISP sense, but manipulations on its dynamically reconfigurable string arrays achieve some of the same things.

11 Breakpoints work by explicitly inserting breakpoint functions, which in turn invoke the post-mortem debugger.

12 Functions available in modules supplied with Issue 2 of the Blitz User newsletter.

13 Standard system includes AmigaDOS interfaces for Exec, DOS, Graphics, Intuition, and Diskfont libraries. A full system interface set is an option.

14 Compiled programs are executables that don't require the compiler, but do require the hisoftbasic.library.

15 AmigaDOS interface routines can be generated ".fd", ".h", ".i", or other files distributed by Commodore as a standard part of DOS support releases.

►

well, with Pascal variables available from assembler.

The editor is powerful and integrates with the compiler and debugger (which can run separately), even supporting compiles to memory. The debugger displays source and assembler, and manages steps and breakpoints, but it handles only symbols, not full variables or expressions. AmigaDOS support units are supplied in a precompiled library and source form. The compiler doesn't generate system calls directly, but they are easy to write using the excellent in-line assembler. The system also includes some Borland Turbo Pascal libraries for easy porting to and from MS-DOS.

The system is fast and performs well. I have only minor complaints: The compiler doesn't produce true FPU code (its math libraries use FPU if it's there) or 68020+ optimized code, and the debugger could be higher level.

Benchmark Modula-2

Benchmark Modula-2 ($200, ***Armadillo Computing***) comes with editor, compiler, linker, and examples. The MicroEmacs-based editor presents an integrated interface, though any editor works at the CLI.

Options include a nice source-level debugger (for walk-though or post-mortem work) and the Modula-2 Assistant (project manager, librarian, and help system). The C Language Library contains modules that implement C-equivalent functions. The Simplified Amiga Library allows for easily hooking into various Amiga features, and the IFF & Image Resource Library deals with IFF files. (Libraries are priced in various packages.) Finally, Armadillo's *Modula-2 and the Amiga* book and disk ($75; less with language purchase) teaches Modula-2 to those with programming experience.

The compiler doesn't support 32-bit optimizations for 68020–68040 processors (or direct FPU code) and the debugger didn't work with the 68040. The system hasn't been updated for 2.0 or 3.0, which isn't a real problem for the compiler proper. Armadillo plans 2.x definition modules for late '93. Meanwhile you can get 2.04 modules from Aglet Software, PO Box 3314, University Stn., Charlottesville, VA 22903.

The Bell Labs Languages

Today's most popular professional-development languages were designed by AT&T's think tank, Bell Labs. The C language removed complexities from the compiler by providing dynamic memory allocation, I/O storage, and so on through libraries. Since C's release, the ANSI committee (which establishes programming standards) has changed it somewhat, making type checking stronger and standardizing library support.

Meanwhile, Bell Labs built a "C with classes." C++, largely compatible with C, adds objects without attempting to change C. There are slight differences, however, because C continued evolving during C++'s development. An ANSI standardization effort is now underway for C++.

The SAS/C Development System

SAS/C ($395, ***SAS Institute***) is the professional standard on the Amiga. It implements a two-pass compiler, global and peephole optimizer, and various other functions as Amiga shared libraries. Programs include a compiler front-end, linker, editor, debugger, assembler, object librarian, make tools, and more. The disks contain includes for 2.x and 3.x and a good set of linker libraries for standard C functions. SAS/C allows for strict ANSI compliance or K&R looseness, but defaults to relaxed ANSI. Compiler enhancements allow auto-

Free "Speech"

A number of Amiga languages are freely redistributable—that is, available for use without purchase. With these, you're on your own much more so than with a commercial package. Sometimes the author has an e-mail address on a telecommunications network, but you probably won't get a full set of tools, include files, etc. On the other hand, some of these languages have no commercial equivalents. And trying a freeware system may help your buying decision. Here's a sampling:

A4th This public-domain FORTH compiler/environment by Peter Appelman has a reasonable interface to Amiga libraries.

ACE David Benn's optimizing Amiga Basic compiler produces stand-alone programs. Enhancements to Amiga Basic include recursion, type casting, constants, structures, enhanced sound, turtle graphics, and other good stuff.

Amiga E Designed and implemeted by Wouter van Oortmerssen, E is a weakly typed structured language with support for lists, functions, exceptions, in-line assembly, and interface modules for AmigaDOS functions.

A68k The A68k assembler by Brian R. Anderson and Charlie Gibbs, has a good reputation.

BC-FORTRAN This FORTRAN-77 compiler by Andre Kästli includes compiler, linker, and libraries. This is a "consumer" version, designed for learning rather than full power development. A professional commercial system is also available from the author for a price.

DICE Matt Dillon's Integrated C Environment is a nice Amiga-specific ANSI C compiler system. A commercial version is in the works.

GNU-C This C and C++ compiler from the GNU project is nonstandard, but has a reputation for producing good-quality code.

Icon Ralph Griswold's follow-up to SNOBOL4 is a string-processing language, but more powerful, and based on a modern Pascal/C-like syntax.

J A dialect of APL that uses the standard ASCII character set, J (like APL) was invented by Kenneth E. Iverson. It comes with source (in C) and a reasonable tutorial.

PERL This is an interesting interpreted string-processing language, popular on Unix systems.

XLISP LISP, a powerful list-processing language, is kind of Logo's big brother. This object-oriented version by David Betz is good for learning LISP and object-oriented programming.

Besides languages, you can find demos of commercial systems on networks (see On-line Scan, p. 8, for details on contacting the network services. Free support tools (project managers, debuggers, shared libraries) and all sorts of examples are there for the taking, too. □ *—DH*

matic generation of direct AmigaDOS function calls.

The supplied text editor provides an integrated feel, but you can use another. The source-level debugger offers an excellent two-window environment, and supports library and multitask debugging and traps in conjunction with Enforcer. You can run or configure SAS/C from either Workbench or a Shell.

I recommend SAS/C as a mature, well-designed system for the advanced or professional programmer.

Comeau C++

Comeau C++ With Templates ($250, ***Comeau Computing***), a version of C++ 3.0, is based on AT&T's cfront compiler, which outputs C code. Therefore, Comeau C++ requires that you purchase a C compiler separately, which becomes part of the C++ system to produce binary output.

Comeau supports recent C implementations, including SAS, Manx/Aztec (no longer in development), and the freely distributable DICE. Because it must make many passes, this kind of compiler is slow. With SAS/C, though, it's acceptably fast on my system. Included with the two floppies is a loose-leaf book with an Amiga addendum (Comeau supports C++ on most platforms), a short user's manual, and a guide that describes C++ 3.0 completely. While nothing here actually teaches C++, it cites references for learning.

A script installs the system and processes the compiler's includes for safe use under C++. The compiler has a smart front-end that starts phases as needed and automatically determines which C compiler you are using. Called como.rexx, it is an ARexx script, which means you should have ARexx. Finally, with SAS/C's cpr debugger, you get reasonable C++ source-level debugging.

Only two examples are provided since the package is aimed at advanced users. The lack of an AmigaDOS class library means that all OS interface is via normal C (Comeau says a library is in the works). Despite this, I recommend Comeau C++ to anyone using SAS/C, especially those interested in object-oriented programming. It is professional, reliable, and actively supported. And C++ is better than C for large projects.

The Other Languages

The remaining languages don't fit into any category, though all have their traditional strengths.

A/C FORTRAN 77

FORTRAN is well suited to numeric processing. While it was not designed as a structured language, FORTRAN today supports standard structured control statements and subroutines—but no user-defined data types. ***Absoft***'s **A/C FORTRAN 77** 2.2 ($295; $495 for 68020 version) is an implementation of the ANSI standard. Its manual details Amiga specifics and the language. The system includes compiler, debugger, linker, and librarian, but no editor; you can use any ASCII editor. Absoft's compiler enhances the FORTRAN 1977 standard with recursive subroutines, Amiga library support, and many Amiga functions.

The examples and compiler caused crashes and unexplained failures with the 68040, although not with the caches disabled. Also, df1: seems to be hard-coded in the library search path. Otherwise, A/C FORTRAN is good. For new users, it won't stack up to most of the modern languages; if you need FORTRAN, you'll know.



Amiga Logo

Logo, perhaps the first language designed for teaching, is famous for "turtle graphics," a drawing system suited to beginners. It is, however, quite sophisticated, supporting long variable names, dynamic list processing, recursive functions, local variables, exceptions, a modular packaging mechanism, and other advanced features. **Amiga Logo 1.03** ($99.95, ***Commodore***) comes on a single disk with tutorial and reference manuals that can teach everything you need to program in Logo.

The environment provides a graphics and a text window; you can type commands directly in the text window or enter them into subprograms. Editing is done via an integrated screen editor, and the interpreter is limited to built-in functions. The lack of AmigaDOS calls alone keeps this out of the professional's consideration. My only real complaint is that the text output fails with the 68040 data cache on. Still, I recommend Amiga Logo as a good learning system. The danger of learning Logo first is that other languages may disappoint you.

APL.68000

APL was originally intended as a means for formal expression of math procedures. This gives APL two unique features: it handles arrays as first-class objects with lots of powerful operators, and it uses a symbolic notation not normally found on computers. APL is not truly structured; it supports functions, but its only control mechanism is a GOTO statement. Its powerful operators eliminate many loops and branches, however.

APL.68000 (***MicroAPL***), an interpreter, comes in two versions: **Level I** ($155; $415 for math coprocessor version—7.34F, ISO standard APL) and **Level II** ($495—2.05F, IBM APL2 standard). The latter has a Level-I mode and an FPU-coded version of the interpreter for speed. Each comes on one disk, with manuals on Amiga specifics, the language, a quick-reference guide, and keyboard labels to support one of two APL-symbol keyboard mappings. You can learn to program in APL from either system's manual.

The environment offers menus for common functions, and either a screen editor or standard APL line editor. You can run multiple sessions from APL using the same copy of the APL interpreter. It offers a way to call assembly routines, and several Amiga-specific functions to manage menus and windows, graphics, I/O, sounds, multitasking, and event trapping, though Amiga libraries can't be called directly.

I had no real problems, though APL takes most of your memory when started from the Workbench (CLI users can specify any amount), and the size of APL windows are limited to about 640x360.

J-Forth Professional

Invented to control telescopes, FORTH is based on a set of small functions ("words") and a stack for com- ►

munication between them. Words place data onto the stack or strip it off. Programs consist of a series of words, which in effect extend the language. FORTH is difficult to read, but it is among the fastest development environments once you master it.

J-Forth Professional ($179.95, ***Delta Research***) is a complete system. Its three disks contain FORTH, a tutorial, libraries, and examples. The environment includes an editor with ARexx, and a standard "block" editor. Although it behaves as an interpreter, J-Forth is a true compiler. Each word is compiled into 68000 assembly as entered. J-Forth can also handle precompiled modules and includes, and comes with a utility to translate includes from C to FORTH. While FORTH itself is actually untyped, J-Forth provides words for advanced programming, handling C-style data structures, easy graphics and menus, IFF, and ARexx. It also has an object-oriented programming system suited to building data types for large projects.

J-Forth Pro has a lot to recommend it. Programmers are often put off by FORTH's design, but I advise reading more before either buying it or writing it off.

Programming Picks

True BASIC is probably sufficient for those just learning. If you want your Amiga Basic programs to go faster, Power BASIC or A/C BASIC are obvious choices. If you're hot on writing the next "Lemmings," AMOS or Blitz BASIC both address the game writer directly, albeit quite differently. Devpac 3 may be an alternative here, too, for the serious programmer—because most commercial games are done in assembly.

If you want to move up from BASIC, consider F-Basic as an alternative to C or Modula-2. And for professional use, you can't go wrong with SAS/C. Some, however, find it easier to code in Pascal, Modula-2, or FORTH. Large project work is more maintainable with object classes, so C++ or Oberon are other good professional choices. Scientific users should know their needs, and might choose FORTRAN or APL; and APL is the thing if you lean toward math.

These things said, I strongly recommend reading up on a language before jumping in.You can find a hundered different books on BASIC or C. In the former case, beware, as every BASIC is different. A good beginner's text should help with programming in any BASIC. C++ enjoys a similar level of support. The standard book here is *The C++ Programming Language* by Bjarne Stroustrup, though others may be better for beginners. *Modula-2 and the Amiga* from Armadillo is good for that language; I also like *Modula-2: A Software Development Approach*, by Gary Ford and Richard Wiener. For Oberon, *Programming in Oberon: Steps Beyond Pascal and Modula*, by Martin Reiser and Niklaus Wirth, is the standard text. *Thinking FORTH: A Language and Philosophy for Solving Problems*, by Leo Brodie, is excellent. Finally, there are quite a few books oriented to numerical methods using APL, rather than just the language itself. ■

*Dave Haynie, a senior designer of hardware systems at Commodore, has written such widely-used programs as SetCPU and DiskSalv. Write to him c/o **AmigaWorld** Editorial, 80 Elm St., Peterborough, NH 03458.*

Swiss Please

Both M2Amiga and Amiga Oberon are developed in Switzerland by A+L AG. Their virtues are difficult to ignore. Although at the time of this writing they had no US distribution and outdated English documentation, these issues are currently being addressed.

Amiga Oberon

Amiga Oberon 3.00 ($249) is a complete and newly updated system. The manual I had was for the previous version (current documentation is now being translated to English). The manual describes the system fully, but does not teach Oberon. The editor is good; it supports user-defined menus, plus keyboard and ARexx macros. ARexx macros for three other popular editors are included.

The compiler implements a superset of Oberon. It can make direct AmigaDOS calls with automatic library opening. Module definitions for 2.1 are included, along with source. It handles BCPL pointers transparently and supports a C/assembly compatible STRUCT in addition to Oberon's type-protected RECORDs. The package comes with a smart Make utility and a linker that handles Amiga-standard object files. A nice source-level debugger can intercept an Oberon program compiled for debugging when launched from CLI or Workbench. There are 68020+ versions of most tools.

Library support is good. A startup module that offers an optional dynamic garbage collector manages the system. Other modules include lists (linked, queues, stacks), trees (AVL, binary), type conversions, easy Amiga functions (audio, graphics, requesters, and so on), enhanced types (dynamic strings, dynamic arrays, complex numbers, etc.), and more.

Amiga Oberon can hold its own against anything on the Amiga market, and then some. It adheres to Amiga standards, works on all systems, it's fast, and comes with a good support library. I'll be waiting for the English manual.

M2Amiga

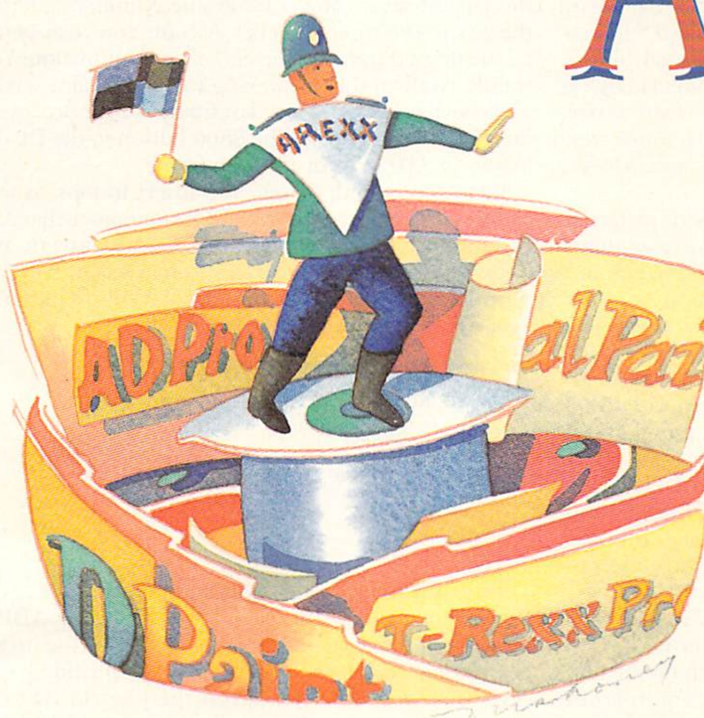
M2Amiga ($249) comes with a Modula-2 compiler, linker, project-management tools, editor, Amiga-interface code, demos, and more. Its manual covers the system but does not teach Modula-2. The compiler is fast, and can produce direct AmigaDOS calls. Definition modules for all 2.04 libraries are included, and accessing a library module automatically opens the library. It comes with a 2.x-enhanced MicroEmacs-based editor that knows Modula-2. It has a built-in help facility, but doesn't actually form an integrated system—the project manager and Make tool are used from CLI or Workbench, not called automatically.

M2Amiga's loader manages modules individually in memory at run-time, eliminating linking during development. A nice window-oriented post-mortem source-level debugger is provided too. There are some aids to debugging in run-time, a module that's basically a super startup, and an error trapper is included with each compiled program. Other modules manage CLI and Workbench arguments, in-line assembler, data conversions, easy windows, and other I/O.

M2 Amiga is fast, easy to use, Amiga-friendly, and up-to-date with the current operating system. The only problems: The English documentation is a bit out of date, and some menus are in German. □

—DH

Directing Graphics Traffic With AREXX



With ARexx as your traffic cop, you can control the flow of graphics files among your favorite applications or imaging devices, and successfully process images in a rich, new variety of ways.

ONE OF THE many things done right when the Amiga was invented was the creation of the common IFF (Interchange File Format) graphic file format. From the beginning, developers have been encouraged to create applications that could interact with each other so that the user could process images in a variety of ways—even multitasking multiple programs in memory at one time. When ARexx was included in Release 2 of AmigaDOS, a common macro language was ratified, spurring most developers to add ARexx control to their programs.

Be aware, though, that there are differences among various ARexx implementations; some are more complete and user-friendly than others. Authoring systems like CanDo (INOVAtronics), AmigaVision (CBM), and Helm (Eagle Tree) let us imbed ARexx control under a push-button graphical user interface, but for many users these solutions offer more power than they need to hook up their favorite applications.

AREXX . . . FOR EVERYONE!

Developers are now starting to provide built-in tools that average users can access to wire together their desktops. Of course, ARexx is right in the middle of things, serving as the digital traffic cop directing the flow of messages. The good news is that upgrades of important programs are adding increased ARexx support, examples, and utilities to make user programming more fun and intuitive. To test the waters, we'll look at the latest **Art Department Professional** (version 2.3, ***ASDG***, $295), a new **DeluxePaint** update (version 4.6, ***Electronic Arts***, $199), **T-Rexx Professional** (version 2, ***ASDG***, $249), and **OpalPaint** (version 2.0, bundled with ***Centaur's*** OpalVision main board software, $699).

You may be surprised to see DeluxePaint mentioned here. The long-promised ARexx interface to the classic paint program has still not arrived; that will come with Version 5.0 if things go as planned. However, using DPaint's recent 4.5 AGA upgrade with a special patch in ADPro converts the paint program to version 4.6, allowing the two programs to interact via an ARexx-controllable loader and saver. This AGA version continues to work with older Amigas.

If you have a NewTek Video Toaster, you'll recognize T-Rexx Professional as one of several programs ►

BY STEVE GILLMOR

that allow automated ARexx control of Newtek's Switcher, LightWave, and ToasterPaint software. But T-Rexx 2.0 doesn't stop there; it offers tools to create scripts for *any* ARexx-compatible program, as well as for devices accepting serial- or parallel-port commands. The latest version is now marketed by ASDG, so it's not a total coincidence that a suite of pre-written command buttons for ASDG's ADPro is included, as well as others for AmiLink/CI (AmiLink), DQ-Taco (Diaquest), Personal TBC-II (DPS), Personal SFC 2 (Nucleus Electronics), CLD-V2400 (Pioneer), BCD-2000A (BCD Associates), MediaPhile (Interactive MicroSystems), PC-VCR (NEC), Studio 16 (SunRize), VISCA (Sony), T-Rexx Pro's LightTV, and ARexx (William Hawes) itself.

LightTV is a T-Rexx Professional utility program that automates the conversion of LightWave-generated images into DCTV (Digital Creations) images and DCTV ANIM animation files. Sentry, another utility that comes with both T-Rexx and ADPro, allows you to monitor a directory and execute a series of ARexx script or CLI commands on any new or updated files within a selected directory. This is an important tool for use with programs like Imagine (Impulse) that still have no ARexx hooks of their own.

All roads certainly lead to and from ADPro these days. Powerful competitors like ImageFX (GVP) and Imagemaster (Black Belt) have made image processing a lively battleground, and the emergence of Centaur's OpalVision 24-bit painting and animation system has extended Amiga technology to rival and in some cases surpass that of other computer platforms. ADPro gives us tools to share images with OpalPaint, and OpalPaint 2.0 adds complete ARexx control over all operations.

Hooking up with DPaint

First, let's examine how DeluxePaint works with ADPro. By default, ADPro will allocate 128K less than the largest fast-memory block available, so we'll limit its consumption on startup. You can set the MAXMEM tool type from the Workbench using the Information... command, or specify a command line option of MAXMEM=bytes if you run from a Shell. I have ten megabytes of memory on my Amiga, so I give ADPro 3MB with the command: ADPro MAXMEM=3000000.

Now run DeluxePaint, then load an ANIM file. Switch screens to ADPro, click the Load Format button, and double-click on the DPaint loader. The DPaint IV AGA Loader screen appears, where you can see information about the width, height, type of image, number of frames, and current frame number. You can move a slider to advance to the ANIM frame of your choice, then click the Show DPaint button to display the current frame. This is not a copy of the frame in DPaint, but the actual original screen now displaying in ADPro. Click as usual with the left mouse button to return to the Loader screen.

Find a frame you like and click Accept to load the frame into ADPro's buffer. Make sure to set ADPro's screen controls in the lower-right corner of the display to the same size, resolution, and number of colors as the frame you just loaded. In my case, the settings are Hi Res, Lace, StdSz, StdSz, and 16 colors. Now choose the Horizontal_Flip operator, execute it, and then click on the Palette button—making sure Palette Control is set to Locked. Now click the Execute button in the lower-right corner to render the data. We have flipped the image, maintaining its palette, size, and resolution so we can insert the new image back into the DPaint ANIM.

Click the Save Format button and double-click on the DPaint saver. Move the Frame Number slider all the way to the right and click Accept. You've appended the flipped frame to the end of your animation. You should confirm this by moving to your DPaint screen and checking that the new last frame is your processed image. You can also use the Show button in the DPaint loader in ADPro to display the frame.

You can append, delete, and insert frames, as well as access DPaint's spare page. But remember that ADPro supports ARexx control of its loaders, savers, and operators, so we can do all this from a script. Here's a script that will place the contents of ADPro's buffer at frame 0 (DPaint's spare page):

```
/* Save rendered data to DPaint spare page */
address 'ADPro'
SFORMAT 'DPAINT'
SAVE 'XXX' 'IMAGE' 'FRAME' 0
OKAY1 'It works!'
EXIT 0
```

Type this in with a text editor and save it as F7.ADPro in your Rexx: directory. Move to your ADPro screen and press the F7 function key. After the image has been saved, a message appears confirming success. Move to DPaint and press the j key to view the spare page, which will contain the image from ADPro's buffer.

A note of caution: If you are working with a single page in DPaint, some ARexx commands may not function correctly. There are no problems with ANIMs, so just add a frame to make things work if you need to. Contact ASDG tech support if necessary; they are aware of the problem and have a fix.

ADPro comes bundled with FRED, a list-manager utility that batch processes sequences of images. The latest release includes a number of ARexx programs you can launch from FRED. You'll find these scripts in the FREDFunctions, FREDOperators, FREDRenderers, and FREDSavers subdirectories in your Rexx: directory. They are a rich source of information and techniques, and best of all, you can just run them without having to know how they work. In fact, SaveToDP4ANIM.fred will process a series of images in a FRED sequence and save them directly to DPaint IV AGA's ANIM buffer. If you are starting with a series of 24-bit files from LightWave, you should first run RenderedAsDefined.fred to convert to the 256 or fewer colors needed to create a DPaint ANIM.

If you scroll down through ADPro's Image Operators requester, you will see a series of operator names with a leading underscore. Dubbed "pseudo operators," these are in fact ARexx scripts that ask for user input and then process your image data under ARexx control. Pseudo-ops shipped in v2.3 include _Emboss, _Fresco, _OilPaint, and _ScaleToAspect. The FRED scripts in the FREDOperators subdirectory are not the same thing; use them only with FRED because

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- ❏ Bard's Tale — Electronic Arts
- ❏ Battle Isle — UBI Soft
- ❏ Battle Squadron — Innerprise
- ❏ Black Crypt — Electronic Arts
- ❏ Cadaver — Image Works
- ❏ Carrier Command — Rain Bird
- ❏ Castle Master — Taito
- ❏ Civilization — MicroProse
- ❏ Drakkhen — Data East
- ❏ Defender of Crown — Cinemaware
- ❏ Dragon's Lair — ReadySoft
- ❏ Dungeon Master — Software Heaven
- ❏ Earl Weaver Baseball — Electronic Arts
- ❏ Emerald Mine — Constellation SW
- ❏ Empire — Interstel
- ❏ Eye of the Beholder — SSI/Electronic Arts
- ❏ F/A-18 Interceptor — Electronic Arts
- ❏ Fairy Tale Adventure — MicroIllusions
- ❏ Fighter Duel — Jaeger Software
- ❏ Fire Power — MicroIllusions
- ❏ First Samurai — Image Works
- ❏ Gods — Konami
- ❏ Hardball — Accolade
- ❏ Immortal, The — Electronic Arts
- ❏ Indianapolis 500 — Electronic Arts
- ❏ It Came from the Desert — Cinemaware
- ❏ James Bond — Millenium
- ❏ Kick Off II — Anco
- ❏ Killing Game Show — Psygnosis
- ❏ Knights of the Sky — MicroProse
- ❏ Leander — Psygnosis
- ❏ Lemmings — Psygnosis
- ❏ Links — Access
- ❏ Lords of Rising Sun — Cinemaware
- ❏ M-1 Tank Platoon — MicroProse
- ❏ Marble Madness — Electronic Arts
- ❏ Might & Magic III — New World Comput.
- ❏ Mindwalker — Commodore
- ❏ Monkey Island II — LucasArts
- ❏ NY Warriors — Virgin Mastertronics
- ❏ OmniPlay Basketball — SportTime
- ❏ Out of this World — Interplay
- ❏ Perfect General — Quantum Qual. Prod.
- ❏ Pinball Fantasies — 21st Century
- ❏ Pirates — MicroProse
- ❏ Populous — Electronic Arts
- ❏ Powermonger — Electronic Arts
- ❏ Prince of Persia — Broderbund
- ❏ Project X — Team 17
- ❏ Railroad Tycoon — MicroProse
- ❏ Rick Dangerous — Micro Play
- ❏ Shadow of Beast II — Psygnosis
- ❏ Shanghai — Mediagenic
- ❏ Silent Service II — MicroProse
- ❏ Sim City — Maxis Software
- ❏ Sinbad/Thr. of Falcon — Cinemaware
- ❏ Spherical — Electronic Zoo
- ❏ Stunt Car Racer — MicroProse
- ❏ Tower of Babel — MicroProse
- ❏ Tower Toppler — Epyx
- ❏ Turrican — Innerprise
- ❏ TV Sports: Football — Cinemaware
- ❏ Virus — Rain Bird
- ❏ Warhead — The Movie House
- ❏ Wayne Gretzky Hockey — Bethesda Softworks
- ❏ Wing Commander — Origin
- ❏ Wings — Cinemaware
- ❏ World Circuit — MicroProse
- ❏ Zak McKracken and the Alien Mindbenders — LucasArts

Don't see your favorite game listed here? Write in your submission below:

____

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ILLUSTRATED BY MARTY SHOHET

these scripts may call corresponding .pre and .post scripts automatically in their execution. FRED .pre scripts set up and initialize global ARexx script variables; .post scripts do clean-up work by deleting temporary files and removing those variables no longer needed.

T-Rexx to the Rescue

If you are in need of a little hand holding with ARexx, T-Rexx Professional 2.0 may be just the ticket. Not only does it have the aforementioned command banks for a variety of products including ADPro, but also its T-Rexx Command Editor (TCE) can be used to create and edit new commands. When you run T-Rexx, you will see the Program Selector button currently labeled Switcher with arrows at either end. Click the left arrow twice to move to the bank of ADPro commands. Just to the right of the other arrow, you will see a button labeled 1/5. Click here to cycle forward or shift-click to move backwards through the five banks of ADPro commands.

It's easy to create a working ARexx script with just a few mouse clicks. You can load a picture, perform a variety of operators, then render and save the result to a new graphic file format. Each command is listed in a window, not in ARexx but in a descriptive English phrase, such as "Bring ADPro to front," "Perform LOAD (UNIVERSAL)," and so on. You can cut, copy, and paste among five scripts active at one time, and test, save, and delete your work—all with button clicks.

Click on the TCE button to load the Command Editor, click again to move to its screen, and load the command bank you want to modify. Let's add a command to ADPro's Bank 5 to load DPaint's spare page into ADPro. Cycle to Bank 5 and double-click on a blank command button. A list of Command Types appears; you can choose to set up requesters for string, numerical, file, path and other input, but let's select Immediate because we already know the command we want to send. Set the Mode toggle button to Real Time so you can fire off this command button in real time from the Command Bank for instant gratification. Click Commit to save the type and mode, then Edit to bring up the Edit Command window. There are six string gadgets to fill in, but you need only be concerned with the first two. Type "Load Image from DPaint" in the first field; this message will be displayed in the Script List if you use this command in

Listing 1 *(Indents indicate line continuations)*

```
/* Automatic brush drop shadow creator for OpalPaint.
 AREXX script by Greg Niles, Centaur Development.
 */
address 'OpalPaint_Rexx'
options Results
SaveSetUp
Panic
AskBool "Drop Shadow Maker v1.0 - by Greg Niles\nClick
        OK to continue, Cancel to Abort."
If Result = 0 then EXIT

/* Ask which brush to use */
AskInt 1 3 1 "Select brush number (1-3).\n(Select CANCEL if
        you don't want to lose your brush!)"
If RC = 5 then EXIT
BrushBay = Result

/* Get size of selected brush */
ActiveBrush BrushBay
BrushSize
parse var result BWidth BHeight

/* Get feather amount from user */
AskInt 0 640 0 "Enter feather amount (0=no feather-
        ing).\nThis determines the 'fuzziness' of your drop
        shadow, in pixels."
If RC = 5 then EXIT
FeatherAmt = Result

/* Get transparency level from user */
AskProp 0 100 50 "Select transparency level of drop shadow."
If RC = 5 then EXIT
TransAmt = Result

/* Make a new screen */
CurrPage
OrigPage = Result
PageRes
AddPage 640 400 Result
OpenPages
NewPage = Result
PickPage NewPage

/* Place brush in center of new screen & in alpha channel */
PageSize
parse var result PageWidth PageHeight
XPosition = Trunc((PageWidth/2)-(BWidth/2))
YPosition = Trunc((PageHeight/2)-(BHeight/2))
ActiveBrush BrushBay
Handle 0 0
ColorSource Multicolor
PutBrush XPosition YPosition
WorkMode ALPHA
SetDrawMode 4
```

building a script later. The second field contains the ARexx code:

Address 'ADPro' 'LOADER' 'DPAINT' 'XXX' 'PAGE' 'FRAME' '0'

Click OK to close the window. The command button you edited will still be blank; you will need to load the image file that contains the button graphics (GI_ADPro.pic) into DPaint and add some text to label it later. For now, click SAVE to save all the work, and then Quit back to T-Rexx's main screen. Cycle through to the ADPro bank of buttons, and shift-click once to go to Bank 5. Click on the R-Time button to allow instant execution of the command, make sure that ADPro and DPaint are running and that there's an image on DPaint's spare page, and finally click on your new command button. Nothing happened? Actually, the command worked; you can navigate to your ADPro screen and click ReDisplay to see the spare-page image. But let's use some of the other command buttons to assemble a script that displays the results for more than a split second.

First click the Clear button to clear out any existing commands from the Script List. Deselect the R-Time button by clicking again on it. Cycle to Bank 1 of the ADPro commands and click on the ADPRO TO FRONT command button. Cycle to Bank 5 and click on the newly created DPaint Load button. Cycle back to Bank 1 and click on the Show button. Now the Script List reads:

Bring ADPro to Front

Load Image from DPaint

Begin Display of rendered image

We need one more element: a little time. Click the right arrow on the Program Selector button (currently labeled ADPro) twice to move to the Switcher command bank. Now click the WAIT button (the second button in the first row) and a requester appears with sliders to set a time duration in hours, minutes, seconds, and frames. It defaults to five seconds, so click OK to finish writing the script. Click TEST and a requester asks if you want to save this script before testing. Now click OK, or click Cancel. Either way, the script runs: ADPro comes to the front, the image loads, and it displays for five seconds.

Enhanced Operations with OpalPaint

Centaur's OpalVision 24-bit paint/animation system interfaces with ADPro via a saver and an operator. The ►

```
Zap
SetDrawMode 1
ActiveBrush BrushBay
Handle 0 0
ColorSource PaintPot
ActivePot 1
PutBrush XPosition YPosition
WorkMode Image

/* Feather the brush */
ActiveBrush BrushBay
Feather FeatherAmt

/* Ask for position of drop shadow */
Okay "Choose the location of your drop shadow."
Handle 0 0

GetPoint
parse var result XDropPos YDropPos

/* Let's do it! */
Busy
WorkMode Alpha  /* Paste drop shadow into alpha channel */
Panic
SetDrawMode 1
ActiveBrush BrushBay
Handle 0 0
ColorSource PaintPot
TransType Standard TransAmt
Trans Enable
ActivePot 1
PutBrush XDropPos YDropPos
Trans Disable

/* Calculate size of area to contain brush & drop shadow */
X1 = MIN(XPosition,XDropPos)
Y1 = MIN(YPosition,YDropPos)
X2 = MAX(XPosition+BWidth,XDropPos+BWidth)
Y2 = MAX(YPosition+BHeight,YDropPos+BHeight)

/* Cut brush with alpha drop shadow */
WorkMode Image
ActiveBrush BrushBay
CutMode Normal 1
RectCut X1 Y1 X2 Y2

/* Go back to old page */
PickPage OrigPage

Okay "We're done! Paste your new brush anywhere you want!"

RestoreSetUp
NotBusy
EXIT
```

saver works directly with the display card, allowing raw 24-bit color or gray-scale images or rendered images from two to 256 colors to be displayed. We can modify the DPaint Save script we wrote earlier to work here:

```
/* Save raw 24-bit data to OpalVision board */

address 'ADPro'

SFORMAT 'OPALVISION'

SAVE 'XXX' 'RAW' 'SCREEN_TYPE 3'

OKAY1 'It works!'

EXIT 0
```

Saved as F8.ADPro, this displays raw image data in hi-res interlaced mode until you either click on the screen or press the space bar. You can display an image for a specified amount of time by adding a duration, as in

```
SAVE 'XXX' 'RAW' 'SCREEN_TYPE 8 DURATION 100'
```

which shows the image for two seconds in lo-res overscan.

The operator gives you direct access to OpalPaint, letting you touch up and modify the raw image data in ADPro's buffer interactively. Here again, it's a good idea to limit ADPro's memory grab with MAXMEM before using the OpalPaint operator. In fact, the operator starts up the paint program, then loads in the raw image data from ADPro. The actual data, not a copy, is used, and the operator will fail if OpalPaint is already running. Simply select the operator from the Image Operators requester and execute it; in a few seconds your image appears in the paint program. When you exit OpalPaint, a requester prompts you to preserve your changes and, if you accept, reloads the modified image into ADPro. If you haven't made any changes, the original image is automatically restored.

It would seem that OpalPaint's hooks to and from ADPro are not even as powerful as those to DPaint, but, in fact, you can access every last one of OpalPaint's powerful suite of tools via ARexx. You can run ARexx macros within OpalPaint or from outside the program. For example, Listing 1 (see box), a script written by Greg Niles of Centaur Development, provides a way to automate adding a drop shadow to any brush.

It's easy to tell from the name of each ARexx command in this script just what the action will be. Briefly, here's how the script works. After addressing OpalPaint's ARexx port and enabling results to be received, the current OpalPaint settings are saved. "Panic" simply resets the system to initial defaults. A title message is displayed, then the user is asked to select one of Opal's three brush buffers. The choice is stored in a variable and made the ActiveBrush. The brush size is measured, with its width and height stored in variables.

Next the user is asked to define an amount of feathering for the drop shadow, as well as a transparency level. The "AskProp 0 100 50" parameters display a slider that defaults to 50% transparency within a range of 0 to 100. The next block of commands saves the current page number, determines the current page resolution, adds a new page in that resolution, and moves to the new page.

The center of the new screen is calculated and the brush is stamped down there. Now OpalPaint is switched to its Alpha Work mode, where you can define and edit an eight-bit (256-level) transparency mask or channel over the image. Next Opal's DrawMode is set to one of its 18 built-in operators (there are also 45 loadable draw modes on disk), in this case Negative. "Zap" applies this mode to the entire Alpha channel, making the channel 100% transparent. Now a single-color, opaque version of the original brush is stamped down at the same coordinates, making a mask around the original brush.

Next the brush is feathered, which softens its edges by varying the transparency. The user is allowed to interactively select the location of the drop shadow in relation to the original brush, and we're ready for action.

Reentering Alpha mode, the brush is stamped down again with the user-defined amount of transparency at the offset just defined. As the comment in the code indicates, the size of the final brush is calculated to include both the original brush and its offset drop shadow. The "CutMode" command includes the "1" parameter to enable "Use Alpha," which employs the Alpha channel information to make the drop shadow area semi-transparent in the final brush. Since the brush is picked up from a black background, when this new brush is stamped on a scene, the drop shadow paints semi-transparent black over the picture. This realistic look is common these days in high-end video production.

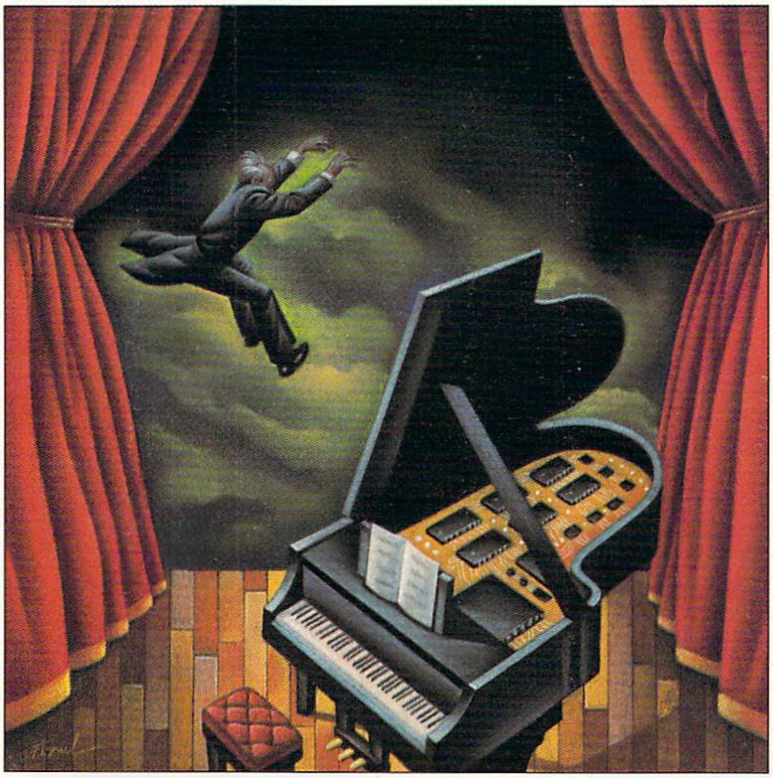
If any of this is confusing to you, remember: The beauty of ARexx is that you don't have to know how it works, just that it does. There are no ARexx examples included on OpalVision's disk set, but Centaur maintains a vendor area on the Portal network, in addition to its own BBS. This drop-shadow script and many others written by OpalPaint users are available there, and OpalPaint's author, Martin Boyd, can often be found on Portal's on-line graphics conferences.

Centaur is readying a new version of OpalAnimate's MakeAnim24 that runs from the command line, allowing generation and playback of high-quality animations under script control. There are plans for improving the connectivity between OpalPaint and ADPro, as well as for similar hooks to ImageFX and Imagemaster. ADPro 2.3 has added a Framestore loader so that Toaster imagery can be easily integrated with these other tools. At a recent CES in Las Vegas, Digital Creations demonstrated its newly-announced multiple video-slot peripheral, Video Slot Box, with a Toaster and OpalVision running side by side in the same machine. Although some might question the value of ARexx interconnectivity on a single image, multiply by the thousands and even millions of individual frames needed to fill a complex morphing sequence in a film, or the 600 megabytes of data on an interactive CD-ROM, and things come quickly into focus. This degree of remote-control automation makes possible networking not just between programs and peripherals, but also among multiple Amigas and even multiple platforms. ■

*Steve Gillmor has worked extensively with both ARexx and authoring systems, and has witten numerous articles on these topics. He serves as director of Southern Digital, Inc. in Charleston, South Carolina. Write to him c/o **AmigaWorld**, Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

THE *Musical Amiga:* OPUS 1

BY RAYMOND MLYNCZAK, D.M.A.



The first segment of our two-part guide to Amiga music making reveals how to get started with some basic tools.

IF YOU'VE BEEN searching magazines and books for a practical, systematic approach to Amiga music making, you probably haven't found it—until now. Because you know a little bit about music but hunger for details of how to play your Amiga, what you need is not another review of music software or an examination of the intricacies of sampled and looped waveforms. No, what you need is basic information on what's what and how to begin.

Well, here it is. This month and next, we'll examine all the pieces that go into Amiga music making, and show you what they do and how they fit together.

HERE AND NOW

Musically, the Amiga has come of age. Today, your Amiga can teach you music, be your instrument, or be your orchestra. It's all at your fingertips, and you don't have to be a virtuoso. In fact, if you know music theory, you don't have to play an instrument at all. I don't want to mislead you. Some ability to play the keyboard is definitely helpful, and the more experience you have, the easier it will be. But it's really the music in your mind that counts. The Amiga doesn't care how long it took or how many changes you made.

Although you can enter musical data via keyboard or mouse, doing so can be cumbersome and slow. Most people prefer to hook up an electronic keyboard to the computer. Prices for such keyboards, including the computer interfaces necessary for connection, start at around $700 retail from manufacturers such as Kawai. While you can interface other instruments—such as flute, guitar, and even your own voice—to the computer, such interfaces cost anywhere from $500 to $1000 at street prices. *(To contact the developers of products mentioned, consult the "Manufacturers'/Distributors' Addresses" list on p. 94.)*

The Miracle Piano Teaching System ($399, ***The Software Toolworks***) comes with a keyboard and software to teach you how to play the piano along with the appropriate music theory. Although the keyboard does not come with a MIDI interface ►

ILLUSTRATED BY FRED LYNCH

(Musical Instrument Digital Interface), it is MIDI-capable, meaning that it can share data with other devices supporting the MIDI communications standard.

Other avenues for music-theory instruction include lessons, books, and other software designed to introduce fundamentals. My own **Keys to Music** program ($59.95, ***Electric Theatre***), teaches music theory and complements any instrumental study, but leans toward music composition. Volume 1 (there are five volumes) is for beginners, while later volumes progress to advanced harmony.

Music Processors

Music composition-and-editing programs are very much like word processors—with the functionality of tape recorders. These programs are generally called sequencers, which is a logical name because in their simplest forms they can create and play back a sequence of musical events. Sequencers come in two main varieties, differentiated by the computer file formats they generate. SMUS (for Simple MUSic, pronounced "smyooze") is an IFF (Interchange File Format) file type, while MIDI links the computer with external devices. (There are also proprietary formats called mods, which are generally used in freely distributable software.) Nowadays, distinctions between sequencer types are smaller, but they do exist. It's up to you to choose the right tool for the job.

The choice you make depends on the result you wish to achieve. Although experiment and chance are valid and necessary for creation, a direction and vision of the total project can help you determine the pieces you need.

If the end product is for a computer-only presentation, the music should be in SMUS format and use internal sounds. With some good sound samples, the Amiga's four internal sound channels can do an impressive job. If you have external devices such as synthesizers, some presentation programs (including Electronic Arts' DeluxeVideo III and Commodore's AmigaVision) can access these devices and use SMUS scores.

Because the Amiga is multitasking, you could use a more sophisticated MIDI sequencer with ARexx capabilities to achieve the highest quality your sound generators can produce, and play those sounds, along with your best visual creations, live and in real time. There is a drawback, however, and that is portability—unless you can figure out how to get all those synthesizers inside your Amiga. Well, somebody did.

The Blue Ribbon SoundWorks' **One-Stop Music Shop** package ($649) includes a board that plugs right into an A2000, A3000, or A4000 series Amiga. It has the award-winning E-Mu Proteus SoundEngine with hundreds of 16-bit samples that you can edit to design new sounds. With 32 channels of sound, a built-in MIDI interface, and an impressive array of instruments and drum kits, this board could make your Amiga levitate!

Wired for Sound

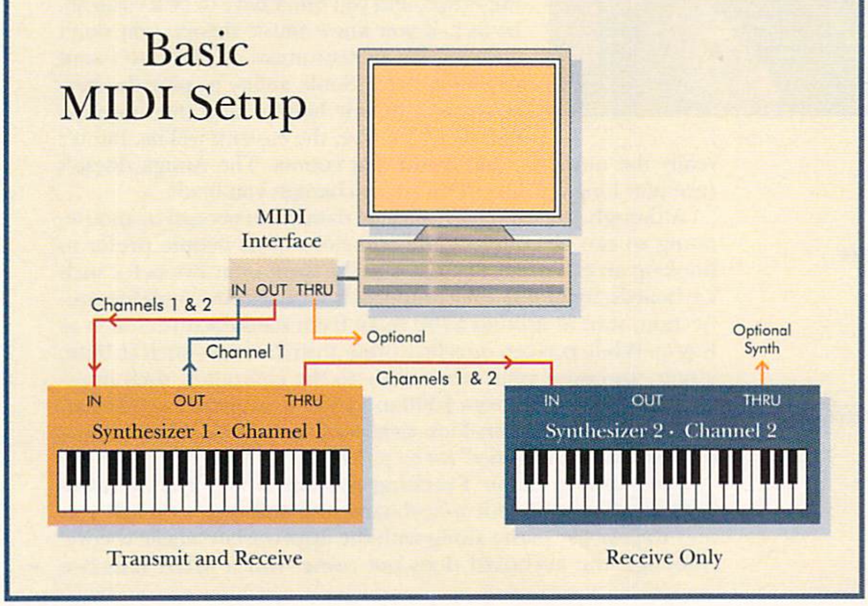
To enter or play back music through an external keyboard or other such device, you need a MIDI interface. This comes with its own cable and connects to the Amiga's serial port. MIDI keyboards and keyboardless sound modules (synthesizers) attach to the interface using cables with five-pin DIN plugs on each end. The MIDI interface and external devices are equipped with three or more DIN sockets marked In, Out, and Thru.

In a simple setup using only a keyboard and a computer, the keyboard Out is connected by cable to the computer interface's In. This enables the keyboard to transmit a signal and the computer to receive it. The computer Out is also connected to the keyboard In, allowing the computer to transmit a signal (music it recorded) to the keyboard. Out always originates a signal and In is always a receiver.

MIDI uses 16 channels. An important point to remember is that the transmitter and receiver must be set to the same channel. If the keyboard is set to send through channel 1, but the computer software is set to receive on channel 2, the computer will ignore the incoming signal.

Normally, you would connect a second synthesizer to the Thru of the first synthesizer and let it receive on a different channel, such as channel 2. If you had two separate tracks of music recorded by the computer, you could set these tracks to play back on different channels—say, 1 and 2. The result: The computer transmits both tracks simultaneously at its Out port. Synthesizer 1, tuned to channel 1, receives both tracks at its In, but responds only to the track (music data) sent on channel 1. Both tracks from In are simultaneously sent to Thru, which is connected to synthesizer 2. Synthesizer 2, set to receive on channel 2, accepts both tracks at its In, but responds only to that sent on channel 2. Both tracks pass to Thru, but because there are no other devices in this example, the data terminates there. (The "Basic MIDI Setup" diagram at left illustrates this.)

If you had more devices, you could connect the Thru of the previous unit to the In of the next. The Out port is used only when a device is a transmitter, that is, for a computer or keyboard used to enter data/music into the computer.



Musical Data

Sometimes people use the term "digital

recording" to describe computer music. Don't confuse this with the sound you hear on a compact disc or digital tape, though. A computer can record sound with the help of an audio digitizer, but the result (called a sound sample or digitized sound) can be a very large file.

What the Amiga can record, without the aid of a sampler or sound digitizer, is a sequence of events or, simply, a "sequence." A sequence is like a script, which tells an actor what to say and do, but it is not itself the actor. A musical sequence tells a sound generator when and how to play, but it is not the sound generator. The sound generator is a synthesizer or a sound sample.

Each step of a sequence is called an "event," which indicates that at a certain point in time something happens. The difference between MIDI and SMUS sequences lies mostly in the type of events recorded. SMUS sequences have certain other characteristics that we'll explore further next month.

The most basic event is a "note on." This means that at a certain point in time—say, measure one, beat one—a note plays. This is denoted by a number from 0 to 127. The lowest note recognized is 0 and the highest is 127; middle C is considered number 60, whereas middle C sharp is 61.

Along with this, the note's velocity, or volume, is recorded. Velocity also ranges from 0 to 127, with 0 being the softest (actually, inaudible) and 127 the loudest. Be aware, though, that some inexpensive synthesizers do not respond to velocity changes.

The third piece of information recorded as part of an event is the duration, or length, of the note. At the end of a note there is an automatic "note off." If the synth for some reason does not get the note off (if the MIDI cable is disconnected or a glitch occurs), it will play forever—or until you power down.

This is the extent of the information recorded in a SMUS sequence. You can attach other data, such as instrument (IFF sample) names and locations, tempos, time signatures, channel numbers, and so on, but that is generally edited in later in a global way.

By contrast, a full-featured MIDI sequencer can record much more information. This extra data allows you absolute control over all aspects of the music recorded and played. Thus, there is a potential for extremely large files. Some inexpensive synths cannot deal with some of this data and therefore cannot transmit it to a computer. Further, if such a sythesizer received this data from a computer, the synth would ignore it. Even high-priced synths can have limits on certain types of data and have idiosyncrasies in the way it is handled. Most of this data takes the form of "controllers." Some controllers are simple on-off switches while others, called "continuous controllers," can handle extremely large amounts of data. "System Exclusive" (sys/ex) messages, which speak only to a certain synthesizer or sampler in your system, can transmit huge data dumps to specific addresses. A MIDI sequence can also support higher resolutions, nonstandard note values, and various other fine-tuning aspects. A MIDI sequencer can be an extremely sophisticated tool for creating and editing music.

Just Betweeen Us

Many music programs can convert a standard MIDI sequence to a SMUS sequence, but the process involves stripping away some data and rounding out the rest. If your composition relies heavily on the extended resources of a standard MIDI sequencer, you will be very disappointed with the result. If your intention is SMUS, use a SMUS sequencer, or else keep in mind the limits of SMUS so that the conversion will have no perceptible effect.

You should also take care when saving in a MIDI format. Standard MIDI format retains all the intricate data needed to reload and play or edit your work—even on a different but capable sequencer. What is not saved is the environment or special setup that you might have used when you were working on a particular composition.

More importantly, shortcuts you might have used in arranging your composition may be proprietary to the sequencer and thus lost during a standard save. Things such as loops (repeated sections) and song construction are handled differently by each program. If you want to save in standard MIDI for use on another program, it is best to avoid shortcuts. Instead of using a loop, for instance, copy and paste the section. Use the same technique when combining sections into longer compositions, or "songs." This is inconvenient to accomplish and to change, but it's necessary. My advice is to always save a copy of your work in the proprietary format. The next time you open up that composition, it will be just as you left it.

While SMUS may seem like a stripped-down brand X compared to the data a full-featured MIDI program can record, you can achieve impressive results with it. What you need are good sound samples and a good composition. A top-notch actor or actress with a creative script really doesn't need the extras.

Making It Happen

I wouldn't want to end this without mentioning the products that make music possible on the Amiga.

Deluxe Music 2, the long-awaited upgrade to ***Electronic Arts'*** Deluxe Music Construction Set, should be released by the time you read this. The program was always easy to use, but this version is even easier. Deluxe Music is mainly mouse driven; if you've used a word processor, you'll feel right at home. While its MIDI output is improved, however, MIDI input is still cumbersome. So if you want to do some heavy-duty playing, you'll have to look to the big guys.

Bars and Pipes Pro ($429, ***The Blue Ribbon SoundWorks***), **KCS** ($379, ***Dr. T's Music Software***), and **Music-X** ($199.95, ***Hollyware***) are some of the choices. All are full-featured sequencers—and can have steep learning curves. The best thing to do is read reviews and try demos of them. Some may be more intuitive to one person than to another. Both Blue Ribbon and Dr. T's have full lines of compatible software and hardware accessories.

A new entry, **Sequel**, should be out in a few months. Publisher ***Diemer Development*** promises a very different interface to an easy-to-use sequencer. Before you buy any sequencer, though, check that it reads and writes IFF files and can use IFF sound samples; some need utility programs to accomplish this.

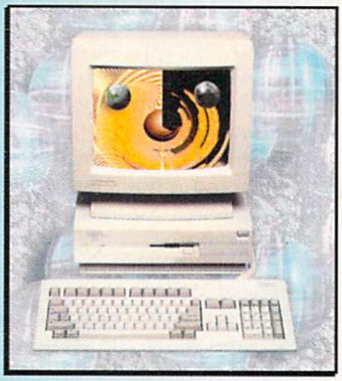
Next month, we'll key up with the different types of recording. Stay tuned! ■

In addition to a 35-year music background involving performance and teaching, Dr. Raymond Mlynczak has seven years' experience with the Amiga. Currently, he is president of Electric Theatre.

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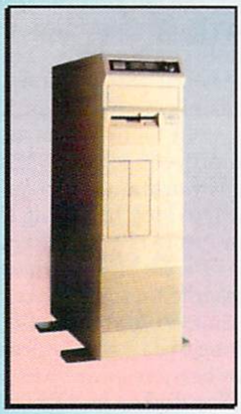
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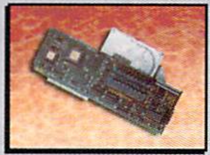
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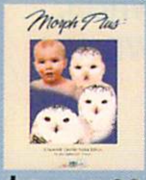
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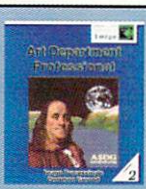
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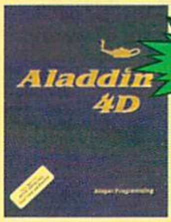
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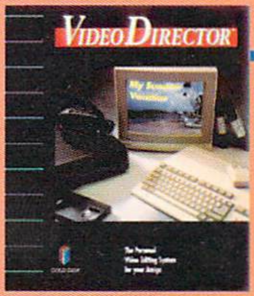
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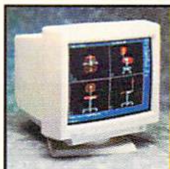
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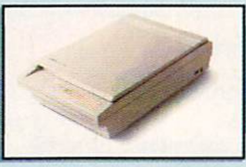
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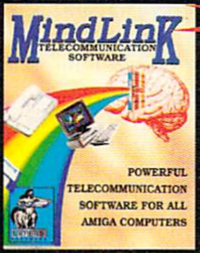
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ACCENT ON GRAPHICS

Morph Tweens

54

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

IN THE WAKE of Michael Jackson music videos and films like *Terminator 2*, morphing software has enjoyed a wave of popularity on the personal computer. Smooth transformations between photographic faces are so impressive that it is easy to get caught up in thinking that this is all morphing is for. This column will explore ways in which you might employ morphing software to assist you in hand-drawn character animation on your Amiga. You draw a few keyframes, then your morphing software "draws" the rest of the animation while you lean back in your chair to watch *Star Trek*. For many projects, the results are quite good.

Be-Tween Gigs

A standard approach to character animation on the computer involves drawing keyframes to represent the beginning and end points of one movement. Then, using features that simulate an animator's light table, one draws a number of frames in between the keyframes to create the effect of smooth motion. This "tweening" is one of the most labor-intensive aspects of animation. With computers being incorporated more and more into the production facilities of major animation companies, automatic computer tweening is one of the more wished-for dreams. Many hurdles remain in that quest, but you can do some interesting "morph-tweening" experiments on your Amiga toward that same goal.

I am aware of three major Amiga programs that perform morphing functions. ASDG has MorphPlus, Black Belt has Imagemaster and GVP has ImageFX. All three of these packages deliver excellent results, share similar features, and offer sophisticated levels of user control. Despite differences in the operation of the particular features, each program yielded similar results in my experiments for this column. Consult your documentation for specific details on setup.

You perform a morph by first loading a source and destination image. You then specify a number of points on the source image over details such as the eyes, corners of the mouth, outline of the face, and so on. Each of these points has a corresponding point that can be repositioned on the destination image. For example, a point positioned over an eyebrow in the source image has a corresponding point that can be dragged to the eyebrow in the destination image. You specify a number of frames and the software gradually moves the region around the source point toward the destination point. The path a point follows is called a vector. By specifying a sufficient number of vectors, every detail of the source image can be smoothly moved, squeezed, and stretched to the location of corresponding details in the destination image. For greater control, vectors can be connected as "edges." You can also control a progressive transparency affecting how the visual details of the destination image gradually fade in over those of the source image.

For this animation project, both the source and destination image will be line drawings. A little thought and experimentation will soon reveal which kinds of movement sequences lend themselves to "morph tweens" and which are doomed to resemble spaghetti bombs of random lines as they progress. A good candidate for your first morph-tweening might be a front view of a cartoon face changing expression as shown in the accompanying illustration. The changes between keyframes are moderate and all lines follow logical unobstructed paths from one frame to the next.

A Good Framework is Key

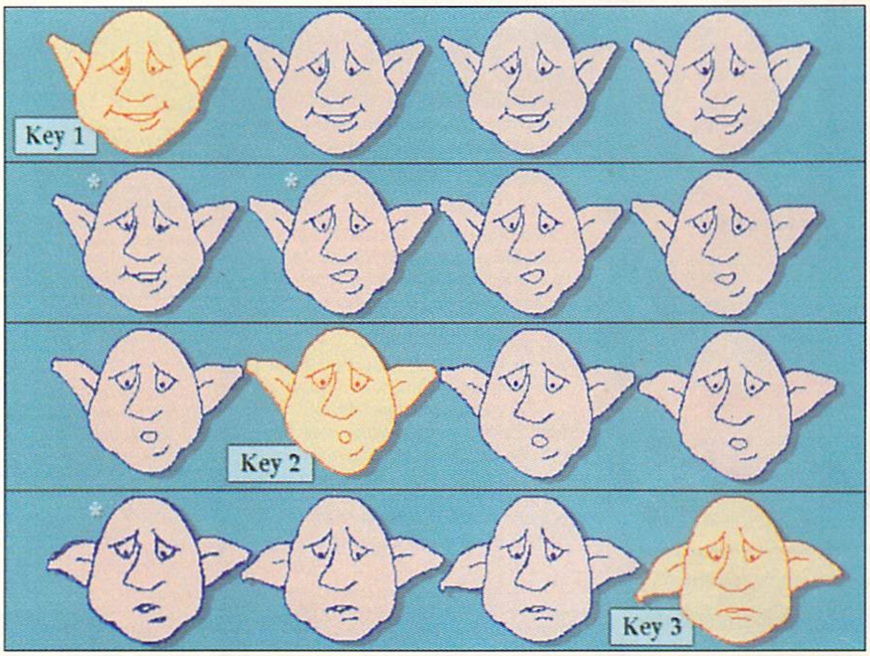
DeluxePaint IV's (Electronic Arts) Light Table and Animation Control panel is a good environment for drawing your keyframes. (For more detail on light-table animation, see "Accent" #40, Jun. '92, p. 52.) For your first

Borrow a little magic from your favorite morphing software to pull off some fast, fun "tweening" in your character animations.

experiments, try low resolution and draw with the freehand-line tool using a brush thicker than a single pixel. Single-pixel lines can break up during morphing. Draw the first keyframe in saturated blue on a black background. Don't fill or color that finished outline drawing. Press the "+" button in the control panel to add a frame and then clear the current frame. Press the Light Table button and the P button to see the first frame as a reference to draw the second keyframe. Save these two frames as pictures, not as an animation. Load them into your morphing software as source and destination images.

Place points along all the lines of the face. I used a total of 82 points to define each keyframe in this cartoon. Logical groups of points such as eyebrows can be connected as edges for increased control. The illustration shows a ten-frame morph between Key 1 and Key 2 and a seven-frame morph between Key 2 and Key 3. Continuing this process with more keyframes can produce a smooth animation of a character talking and changing facial expressions. While the morph tweens in the illustration have been shrunk 50% to fit the page, they have not been retouched. Note that in the first, ten-frame sequence there is a noticeable jump between frames 5 and 6 (marked with asterisks). Between those two frames, details of the source and destination images crossed the mid-morph transparency threshold and the second key began to dominate. In the second, seven-frame sequence that threshold occurs directly on the middle frame resulting in a double exposure. In both cases, some retouching is needed.

As an alternative experiment, follow the same procedure for setting up a morph, but set the transparency curve to a flat line that always shows 100% source image as it is deformed toward the second keyframe. This is called a "warp." The result of a warp morph between keyframes is a smooth transition with no midpoint jump or double exposure. The trade-off is that by the final frame, the lines become a little choppy. In the normal transparency transition, the choppiness is in the middle, with the beginning and end of the morph clean. Overall, I prefer the warp morph because of the smoother motion. The finished outline animation that results from morph-tweening can be used directly with minor retouching, or it can be a template over which you draw a clean single-pixel line by hand. Color the animation with the fill tool and add it to a background. ■



Morphing software was used to create the animation between hand-drawn keyframes in this "morph-tweening" experiment.

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope for a reply.

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Troubleshooting In Paradise—Part 2

In the second segment of our two-part problem-diagnosis guide, we explore more common maladies and the use of test equipment.

By Michael Hanish and Joel Tessler

THE BEST TROUBLESHOOTING tip is prevention. Last month, we established that setting up your equipment properly in the first place can prevent all kinds of trouble. Unfortunately, doing so will not ward off trouble altogether.

In our experience, the NewTek Video Toaster sometimes gets up on the wrong side of bed and refuses to boot initially. If your monitor broadcasts the message, "Toaster not responding," don't panic. It doesn't necessarily mean paradise has fallen. (*For contact information on the companies mentioned in this article, see the "Manufacturers'/Distributors' Addresses" list on p. 94.*)

First, try rebooting. If that fails, confirm that there is a cable connected to Input 1 and that it carries an active video signal. This is important, for this signal is what the Toaster syncs to. If you cannot confirm these things, either provide a valid signal or remove the cable. Also, make sure the Toaster is well seated in the video slot.

If none of these things work, perform an AutoHue before you resort to calling NewTek tech-support: Get the shortest BNC cable you can find and connect the Program output (fifth BNC from the top on the Toaster) to Input 4 (fourth BNC from the top). Double-click the AutoHue icon in your Toaster drawer and follow the on-screen instructions. When AutoHue finishes, recable your Toaster (this will be easy if you have labeled your cable ends and given yourself enough room in the set-up). Don't hesitate to perform an AutoHue any time you doubt the colors of your Toaster matte screens, graphics, or video reproduction.

Testing... One, Two, Three

Your video monitor is your first line of defense in the struggle for video-signal integrity. Last month we talked about setting up and using video monitors with color bars. By itself, though, the use of color bars will not ensure good-quality video. The video signal is hideously complex, and irregularities often do not show up until several generations down the line. If you have multiple sources (as in an A/B roll studio), you can time them roughly by eye using color bars, but to truly fine-tune a system requires use of a waveform monitor and vectorscope.

Amiga owners can find both these tools in two packages for a fraction of the cost of traditional test equipment. **The Monitor** (*Magni Systems*, $1799) provides both tools in a stand-alone external device; ***DPS's* Personal Waveform Monitor/Vectorscope** ($899) does so via an internal board for the A2000, A3000, and A4000. (For details on both products, please see "Video Suite", Oct. '92, p. 48.)

Catch the Waveform

A waveform monitor is a specialized oscilloscope that displays a voltage/time graph of the video signal passing through it. It displays this electronic "picture" on a graticulated screen (see Fig. 1), providing real-time analysis of the levels of all parts of the video waveform: sync, blanking, pedestal, burst, luminance range and levels, and more. Some parts of the waveform are proportionally small, yet still important. To monitor them accurately, you must be able to magnify the display and shift its location on the graticule.

When you send color bars to the waveform monitor, make certain that display represents the proper video level for the bars. Whether they are 75% or 100% bars, the waveform monitor should show one volt peak-to-peak. Anything above 100 IRE, clearly marked on the graticule, will be too hot and clipped off. The bottom "pedestal" step, or black level, should be at the dotted 7.5 IRE line. When the black levels are too low, details get lost. When they are too high, blacks turn to grays, the whole image looks washed out, sync problems can crop up, and you should reach for some laundry brightener to get the colors back into your picture.

The sync/burst part of the waveform is the U-shaped signal on the left. The bottom of the U should be a clean, straight, horizontal line at –40 IRE. Irregularities here indicate ringing and will produce visible scan lines and degradation of the image. To the right is a 3.58 MHz reference oscillation (burst-color information), which must peak between +20 and –20 IRE. Deviation here means poor frequency-response (inaccurate color reproduction) and color aberration (crawl, streaking, ►

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ringing), among other problems.

WHAT'S YOUR VECTOR, VICTOR?

A vectorscope ignores all video-signal information except the color subcarrier frequency (3.58 MHz). It displays this information as dynamic lines along an x-y axis, where distance from the center represents color saturation, and direction represents phase (hue). A vectorscope provides the only technically correct means to accurately measure (and thus adjust) the color levels, saturation, intensity, and timing of one or several color video signals. Ideally, for a multiple-source system, the vectorscope will have several inputs that you can display simultaneously for accurate co-timing. (Magni's Monitor meets this criteria with three composite inputs.)

As you can see in Fig. 2, the vectorscope's display looks like a pie cut into eight pieces; six of these represent different colors. Within each slice is a box containing a smaller box. The smaller box is a target; when the tip of each color-signal line lands there, color saturation is correct. Oversaturation, shown by the color line overshooting the target, results in blurred images with white edges, tearing (wavering vertical lines), exaggerated chroma crawl, and blooming (curvature at the screen edge), among other problems. Undersaturation manifests itself as color washout, which becomes especially apparent when you make dubs.

If the phase of the signal is accurate, the vector line will drive a straight course to the center of the target. Deviation indicates color-phase shift, (change in hue). If the line falls counter-clockwise of the box, colors will shift toward red; if it deviates clockwise, a greenish tinge will be introduced into the picture.

Beyond that, the vectors must be straight. Curved vectors indicate poor differential phase. This means that a baseball diamond, for example, might be greenish on one side but reddish on the other.

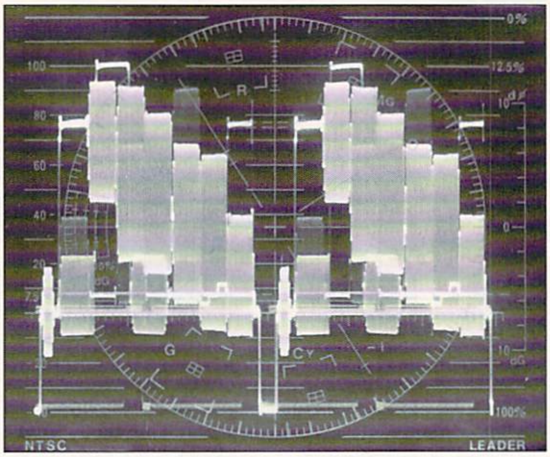


Fig. 1: A video signal, properly adjusted for brightness, is shown on the waveform-monitor's luminance display. Note that the top "step" is centered on the 100 IRE line.

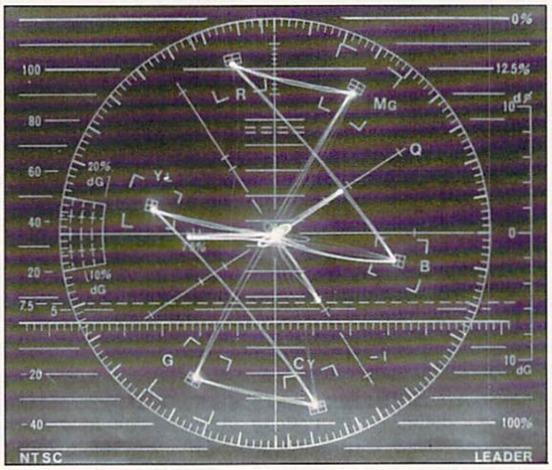


Fig. 2: The vectorscope display tells you about your signal's color saturation and hue.

USING THE EQUIPMENT

Both DPS's Personal V-Scope and Magni's Monitor do a fine job of performing both waveform-monitor and vectorscope tests on the Amiga. Neither requires a special CRT as do traditional devices; both display the results on a standard video monitor. The Personal V-Scope is certainly more affordable, but we prefer the Magni Monitor because of its multiple inputs, better display capabilities (magnification, positioning, and color settings), and reference input.

The TSG software that comes with the Personal V-Scope provides a full range of standardized test signals, including the essential color bars and multiburst. Magni Monitor users who do not have access to a hardware test-signal generator (these start at $400) should check out two freely distributable programs, Video Tools on Tap and Bars'n'Tone. Using color bars and the above information, feed a test signal to each piece of equipment (for VCRs, record a good length of the signal on tape, and use the same tape for each machine). Verify that the video is one volt peak-to-peak, sync is clean and solid, and color phase is accurate.

Testing your video with either of these products requires starting at the beginning of the signal path—and continuing until you reach the end. (If you slap a waveform monitor on the output of your record deck, for example, and notice a 5% drop in the signal level, how do you know at what point in the signal path the problem begins?) Test each piece of equipment individually, with the output sent to your test equipment and looped through to a video monitor and properly terminated. As you adjust the proc-amp parameters, remember that even the most minute change in settings will affect the signal path throughout your system. When you finish with the setup, reconnect the test equipment to the point in the signal path you wish to monitor during editing/production. This will usually be the program output of your Toaster or record deck.

Plan to test every component of your system when you first set up your studio, when you recable or reconfigure, or when you add to it. Testing is especially crucial for the initial setup of any new equipment; you want to verify that

> **"The video signal is hideously complex, and irregularities often do not show up for several generations down the line."**

everything is 100% before the warranty period runs out.

Who Needs It?

If you are setting up an A/B roll system, but cannot afford to buy test equipment, plan to marry someone who can—or at least hire an engineer to come to your studio and do setup and timing.

Even if you are using a basic, single-source system with a small-format tape, test equipment is important. Industrial (nonbroadcast) applications of small formats are especially critical because they work with tighter tolerances, less multigenerational integrity, and more noise. A 5% level drop, which you may not even notice in the first generation of editing, can easily translate to 20% or greater loss by the duplication stage. Line noise, one of the biggest culprits, is so easily introduced and amplified at every stage of production, point in the signal path, and successive generation.

Keep in mind, though, that all the test equipment and processing gear in the world won't make up for poorly shot or badly colored footage. If you try to tweak a low signal with a proc amp, you will likely blow noise into the signal. Save yourself a prayer and do good, solid preproduction. Make sure your camera is properly white-balanced and the scene is properly lit. Monitor the audio carefully as you shoot and edit. And, for heaven's sake, clean your lenses and monitor screens regularly.

When preparing graphics for video, always check them on a composite monitor for safe-area positioning, color crawl, and single-pixel lines prone to jiggling. If you think this is a joke, flip around the channels on a cable system some time. You will see oversaturated graphics, unreadable fonts, and "underwater" audio. The reason you are doing video is to communicate something; don't let the message turn to mush.

Video signals are plagued with myriad problems that probably won't disappear for quite a while. It is important not only to keep in touch with new information and innovations, but also to continually improve the integrity of your video, video graphics, editing style, and signal hygiene. The current buzz-phrase "video literacy" implies a knowledge of how video technology works. As you sit in the middle of your magneto/digital/analog paradise, keep in mind that you are lost if you must rely on idiot lights and automatic script generators to make your pieces—unless you can afford to hire someone to do the work for you. When you produce video, you are putting your reputation on magnetic tape or digital media. ■

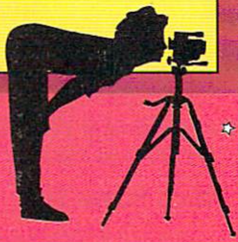
Joel Tessler is a video and animation consultant to cable stations and networks domestically and abroad. Michael Hanish produces Amiga video, graphics, and music for both performance and adult-literacy work.

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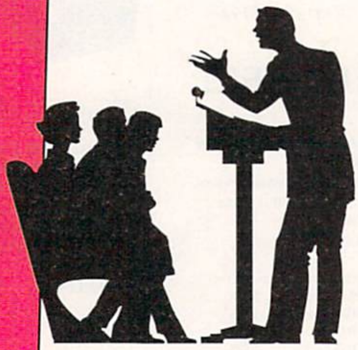
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From p.20.
been corrected. If you have an earlier version of the program, contact the company for an updated one. I commend the Axiom support staff for an excellent job of working on the problems rather than brushing the complaints aside.

Anim Workshop does not, however, currently support AGA-specific color or resolutions, nor the creation of newer OpCode 6, 7 or 8 ANIM file formats. And while the program includes View (3.6), a freely distributable animation and graphics viewing program, this viewer—through some oversight—is not installed during hard-disk installation, nor is there any mention of it in the documentation or read_me file. This version of View also displays animations shifted half a screen to the right—which then requires repositioning.

These problems aside, however, I would recommend Anim Workshop to any Amiga user for easy ANIM creation and manipulation.

—Steven Blaize

Personal Time-Base Corrector III

***Digital Processing Systems*, $850**

RC 2000 Remote, $299.

Amiga 2000/3000/4000.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
1.3/2.0/3.0 compatible.
Minimum system: 2MB.
Recommended system: 4MB, 68030 or 68040.
Installation: Easy.

Time-base corrector, remote controller, and software.

A half dozen years ago, the term "personal time-base corrector" would not have made sense. Cumbersome and frightfully expensive, TBCs were anything but "personal." But technological advancements and the introduction of the Video Toaster have made personal TBCs mandatory equipment for a new generation of video professionals. Digital Processing Systems has been there from the start with its Personal TBC I. Today, the product has grown into the Personal TBC III.

Roles For Rolls

The average video hobbyist may wonder why a videographer needs a time-base corrector. But just consider these factors: Motors on even the best video equipment may fluctuate in speed, quality control varies between brands of videotape, and all tape eventually gets worn and stretched. The untrained eye can't catch such video minutiae, but devices such as the Video Toaster can. It expects every frame to follow the same parameters, and you can set a TBC to correct deviations from those settings.

TBCs work by grabbing the incoming frame and making rapid adjustments to mend even the most mangled. Their ability to repair and restore varies: Some TBCs grab just a few lines and fix only the smallest of errors; high-end correctors (also known as infinite-window time-base correctors) grab the entire frame and correct all but the most serious of flaws. The Personal TBC III falls in the latter category.

For such a competent piece of equipment, the Personal TBC III is a very compact unit. It is mounted on a PC-compatible card that snaps into place in any Zorro slot on your Amiga. Even if you're all thumbs like me, DPS provides a series of diagrams to help you connect the TBC III to your Toaster-based studio in a matter of minutes.

Totally Serialized

Along with thoughtfully provided cables, the Personal TBC III card has a series of DIP switches to expedite the configuration process. Again, the manual provides clear diagrams to help with the set-up process, even if it involves installing multiple TBC IIIs in one computer. Software bundled with the card controls its every move.

Due to its multiplatform design, the TBC III does not communicate with the Amiga through the bus card. Instead, the serial port is pressed into service for signal transmissions. You connect the TBC III either by means of the internal serial connector or the external serial port. While both methods work well, minor problems arise. Using the internal connector leaves the port free, but some video equipment—such as single-frame controllers—will not work with the TBC III plugged in. Using the external port avoids that problem, but the lack of pass-through design prevents other devices from sharing the port unless you unplug the TBC III.

The bundled software includes a full processing amplifier, referred to in video circles as a "proc amp." (Before the recent leaps in video technology, proc amps were often costlier than the TBC itself.) The proc-amp software controls video, black, and chroma levels, and also lets you adjust the hue and horizontal positions. Provisions are also made for strobing, removing color, and grabbing perfect freeze frames.

With practice, you can learn to use the proc amp to adjust the signal to professional specs. The only limitations of the TBC III's proc amp are equally applicable to any other such device: You will need a waveform monitor and vectorscope for consistently perfect signals.

Remote Means

One of the best complements to the TBC III is its optional remote control, the RC-2000. Fully equipped with all the features of the software at your disposal via a smart button and dial box, it's an efficient way to use the TBC III. An LED read-out provides a numeric display of all settings and can control up to eight TBC III units.

Equipped with the RC-2000 remote, the ability to process S-Video, support for external sync from other devices or its own signal, and an ARexx port for additional control, the DPS Personal TBC III is a well-rounded package. It is proof that high-quality video equipment does not need to carry a high price tag.

—Derek Grime

Professional Calc 2.0

***Gold Disk*, $199**

All models.
Hard-drive installable.
Not copy protected.
Accelerator compatible.
1.3/2.0/3.0 compatible.
Minimum system: 1MB.
Recommended: Second floppy or hard disk.

Spreadsheet program with graphing/database functions.

No office is complete without a spreadsheet. The granddaddy of spreadsheet programs, VisaCalc, caused a commotion among bookkeepers comparable to the reaction when scribes heard of Gutenberg's movable type. Hours of tedious graph-paper computations were reduced to moments. Professional Calc version 2.0 from Gold Disk is the most recent addition to this group.

Row upon Row

Pro Calc 2.0, as with any good spreadsheet, uses that same graph-paper

Continued on p. 68.

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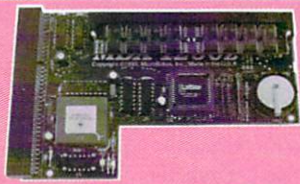
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From p.65.
metaphor—horizontal rows and vertical columns of cells, each waiting to be filled with numbers, letters, or formulae. A cell can be independent, or linked with any number of others, with its value determined by values and operations elsewhere. The sign of any spreadsheet artist is the ability to make a change in one cell and have that change reflected in all other dependent figures.

Pro Calc comes on three disks and includes a very thorough and well-indexed manual. Seventy-one example spreadsheets are included, covering business, law, and household budgets. While the program is completely mouse and menu controlled, keyboard-happy users can access most functions through hot-key combinations. Unfortunately, there is no keyboard overlay or chart detailing keyboard shortcuts, so power-user status comes through practice.

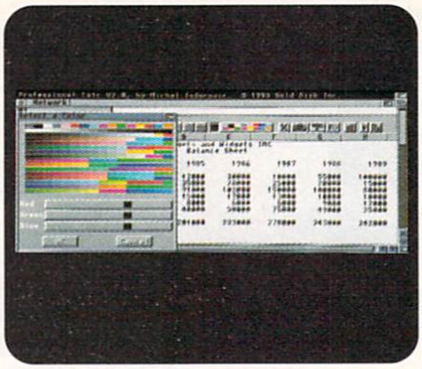
The program allows for worksheets large enough (65,000 rows by 65,000 columns) to accommodate all but the bulkiest of home-office budgets. You can open separate views of your work, and, as with any Workbench window, you can size a view, arrange it with a depth gadget, and control it with scroll bars. With each window showing a different area of the spreadsheet, there's no need to print out a partially completed spreadsheet just to view the formula in one cell and note that it refers to the figure in another.

The spreadsheet allows you to cut and paste between the Clipboard device and files, and words, figures, and functions can all be involved in these operations. Depending on the operation selected, functions that reference other cells will either be maintained or adjusted to fit their new locations.

Word Support

Gold Disk is well known for word processors and desktop-publishing programs, and Pro Calc reflects that heritage. You can show text included in your worksheet in any typeface your system supports, in a range of styles, sizes, and colors. Colors on AGA machines can be any of 256, and can be dithered for more apparent colors on older Amigas. All of these options and others commonly used appear on a tool bar above the work area. This strip of icons lets you bring up requesters or perform functions with a click of the mouse.

Pro Calc also has the ability to create keyboard macros if you find yourself continually repeating the same series of keystrokes. Turn the recording function on, press the keys once, and save your keystrokes as a macro. You can assign a macro to a hot-key chosen from a requester, and even attach it to a particular spreadsheet so it's readily available.



A balance sheet created with Pro Calc 2.0.

Gold Disk also continues two traditions with this program: ARexx support and hot-linking. Two different ARexx ports are available, each with its own features. As with macros, you can attach ARexx scripts to a spreadsheet for automatic execution, or you can choose them manually from a requester. Hot-linking means you can send charts or entire spreadsheets back and forth between Gold Disk's Transwrite word processor and Professional Page desktop-publishing software.

In addition to the normal math functions, your Pro Calc spreadsheets can also use Boolean logic, dates, times and statistical functions. Built-in functions are available to calculate loan payments based on the principal, interest and time period you input. If you can't find the function you need from the more than 130 supplied, you can easily add your own.

Pies That Bind

Charts are not in short supply with Pro Calc 2.0, either. Fourteen different types include pie, line, and bar graphs in two and three dimensions. Defining the information to be graphed is as easy as dragging the cursor to highlight the data you want included and selecting a chart type. You can save charts as IFF files, or in Professional Draw or Aegis Draw formats. You can then print them on any Preferences printer, with separate support for PostScript printing. You can also save them as PostScript files for importation into other programs. You can send output to a disk and select sideways printing for spreadsheets with many columns.

If all this were not enough, Pro Calc even includes database functions, with which you can define any portion of a spreadsheet as a database. This allows you to perform sorts according to different criteria and pull out selected bits of information to form the basis of a new spreadsheet. Pro Calc will also import spreadsheets done with MaxiPlan and Lotus 1-2-3, and will export 1-2-3 format files.

A proven design coupled with support for charts, databases, ARexx, and hot-linking make Pro Calc 2.0 a useful spreadsheet program. Gold Disk deserves hearty compliments for its efforts.

—Rob Hays

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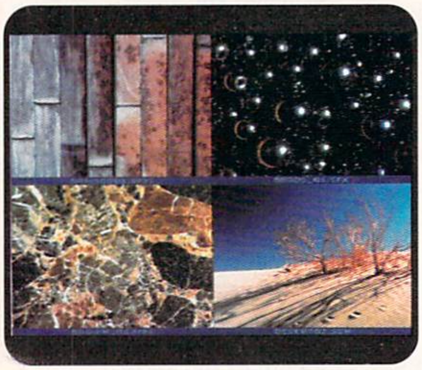
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spice up your graphics or videos? If so, PRO-100 and Pro-60 are two products from Texture City to consider. Image Library on CD-ROM contains 100 different images in four separate formats: IFF24, TIFF, Targa, and PCX. Each image is in 24-bit high-resolution overscan mode (752×480 pixels), and each is roughly 1MB in size. The CD holds approximately 400 megabytes of image data.

Fabrics of Life

Mastered in standard ISO-9660 format,



Texture City scenes and surfaces.

Pro-100 could be used in a CD-ROM drive on an Amiga, Macintosh, PC, or any other computer that reads ISO 9660-formatted CDs and can load one or more of the graphic formats named above. If your graphics work transcends computer platforms, this CD can travel with you.

Filenames conform to MS-DOS standards, with each file's extension an abbreviation of its category. For example, ".AML" means animal fur or skin, ".MBL" indicates some kind of marble, and so on. An accompanying list names every file on the CD-ROM with a brief explanation.

I tested PRO-100 using a CDTV connected to my Amiga 2500 via a parallel cable and Parnet networking software (found on Fred Fish disk #400). Insertion of the CD-ROM immediately crashed CDTV. To circumvent this problem, boot CDTV with a Workbench floppy disk and then insert the CD-ROM. The images are all exceptionally attractive, and a few uses sprang immediately to mind: backdrops for video titling, multimedia presentations, and surfaces for 3-D objects. There's serious potential here—a 3-D Roman temple lavished with marble surfaces; a sofa complete with fabric swatches; a modeled wooden desktop with real polished wood. Other possibilities are visually enticing button backdrops for a user-interactive presentation or a kiosk touchscreen display.

Twisting and Turning

I loaded Texture City's images into Art Department Professional (ASDG), ImageFX (GVP), Imagemaster (Black Belt), OpalPaint and OpalPresents (Centaur), and lesser programs that handle 24-bit images, and proceeded to manipulate them in various ways. My OpalVision 24-bit display revealed their true top-notch clarity and beauty. Some of the files actually don't qualify as "textures": for example, there's a blue sky with puffy clouds, a dazzling sunset, and an East Coast bayside house, to name but a few.

The complaint list is short—the package lacks printouts of its one hundred images, and no thumbnail miniatures or quick-view samples exist on the CD, despite its more than 200MB of free space. You can, however, create your own thumbnail-file indexing screens. I made some with a program called Advantage (Dennis Turkington, Matrix Productions, 319/378-9648). You can load them one at a time, or just load them based on their abbreviated filenames.

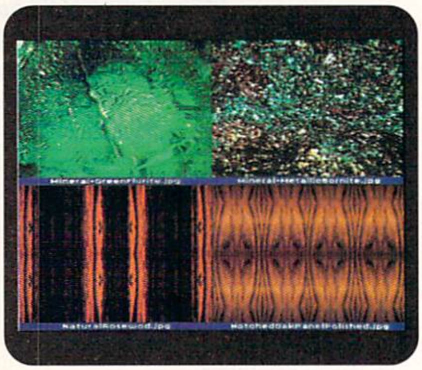
As an Amiga-specific product, the Pro-60 #2 set from Texture City contains 60 JPEG textures and scenes on 15 3½-inch floppies. Thankfully, there's no readily apparent duplication of images between the disk-based set and the CD-ROM's contents. Unlike the CD-ROM, however, the Pro-60 #2 set includes many screensful of 2×2 scaled thumbnail pictures, each captioned with the JPEG file it depicts.

The package also includes a couple of utility programs, one of which installs the JPEG files, thumbnail screens, and some public-domain JPEG-manipulating tools on your hard drive; the other—for use after installation—lets you view the thumbnails (all provided in 320×400 interlaced HAM) or decompress any of the JPEGs back into full 24-bit file format for import into your other software. It's not necessary to install all of the 15 disks on your hard drive, though, for if you examine what's on the floppy disks, you can directly access the JPEGs and thumbnails without using the install procedures at all.

Bearded Wonder Ultimate Collections

AN ALTERNATIVE TO Texture City's CD-ROM and disks is Bearded Wonder's Ultimate Wood Collection (UWC). No fewer than 20 Amiga floppy disks in a three-ring binder with ten pages of printed documentation comprise this collection. Eighteen of the disks contain 122 different JPEG 24-bit 320×400 images. (I would prefer to see them supplied in full Amiga-video high-resolution overscan mode, as in the Texture City collection.) The remaining two disks hold "thumbnail" 768×480 miniature representations of those textures, each labeled to identify the full-size picture it represents.

The Ultimate Rock Stone Mineral



Bearded Wonder minerals and wood.

Collections (URSMC I and II) each contain eight Amiga floppy disks packed into ¾-inch videotape-sized plastic boxes. There are 50 JPEG 24-bit, 320×400 images in each of these two sets, and one disk of each set contains thumbnail-labeled versions of the larger pictures. Documentation for the URSMC sets is similar to that supplied with the Ultimate Wood Collection binder: ten pages of text.

A Wonder Unto Itself

Woods, rocks, and stone surfaces comprise Bearded Wonder's products. Unlike Texture City's packages, no scenic pictures clutter the wares, and don't expect any JPEG-manipulating software to be included. Like the self-appointed surgeon general of image software, Bearded Wonder warns you on the outside of each package that some kind of JPEG loading software is required.

The three major players in Amiga image-processing software—ASDG's Art Department Professional, GVP's ImageFX, and Black Belt Systems' Imagemaster—are all capable of loading these images, manipulating them, and then saving them to disk in another image-file format (GIF, TIFF, IFF24, etc.) or reducing them into various Amiga IFF, HAM, or HAM8 formats. Centaur Development's OpalPaint and OpalPre-

Continued on p. 74.

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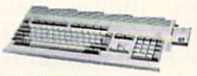
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From p.70.
sents (supplied with its OpalVision 24-bit display card) can load JPEG files, while most Amiga paint programs and 3-D packages first need to have the images converted.

The commercial solutions described above work well, but public-domain JPEG manipulators are another option. Not for the faint-of-heart, these are primarily technically oriented, command-line-driven programs. Regardless of whether you use a commercial package or a PD conversion utility, when you convert a JPEG file into an IFF24 file, the resulting image balloons into a massive file, much larger than its original JPEG size. You need a hard drive and several megs of RAM to deal with 24-bit full-screen images, and an accelerator is strongly recommended—otherwise you'll need a calendar to time the loading and displaying of JPEG files on a stock 68000 Amiga.

Pre-Processed Goods

Oddly enough, many of the images supplied in the UWC and URSMC have already been image processed. Liberal use of Imagemaster created radial waves, sharpened and smoothed many textures, and generally touched up surfaces. As a result, you'll find each type of wood in many different forms: plain, rough, polished, tiled, parquet flooring, and so on.

Some of the textures in Bearded Wonder's packages looked markedly similar when displayed on the Amiga screen. OpalVision's 24-bit RGB display, a more accurate device, often revealed little difference between a plain and a polished version of the same wood. Some images also appeared too dark—an easy-to-fix problem for an image-processing package.

The documentation mentions uses for these textures in 3-D and paint programs, and also in background-generation and titling software. Bearded Wonder's manuals, like Texture City's, provide lists of what is on each of the disks, but offer no printouts of the images for reference. The inclusion of reduced-sized images (thumbnails) is a nice touch; it makes easy work of rapid loading and viewing.

Purchasing collections of textures is like buying sampled sounds or clip art. For the full retail price of both Texture City's and Bearded Wonder Graphics' images (about $1000), you could buy an Epson ES800 flatbed 24-bit color scanner. Then, using photographs and small flat objects that fit on the scanner's glass bed, you could make your own textures *ad infinitum*.

These image packages do, however, solve an immediate problem, since all the basic work has been done for you. Buying canned artwork versus making it yourself is a personal financial decision. These packages won't disappoint, for they contain a wealth of finely detailed images to give your presentations and renderings a professional aura.

—Harv Laser

ADPlot2D

Amiga Tech Scientific Applications, $79.95

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Hard-drive installable.
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Minimum system: 1MB.

Plotting program for scientific applications.

While the Amiga's sound and video capabilities have received great fanfare, the scientific community has justifiably felt neglected when it comes to Amiga-specific applications. This neglect may have spurred ATSA to develop APlot2D.

Plotting Along

As the name implies, APlot2D is a two-dimensional plotting program aimed



Charts are a breeze with ADPlot 2D.

squarely at the scientific user. The primary indication that this is no ordinary Amiga application is that it is programmed in Fortran, long employed in the scientific community for its mathematical features.

With APlot2D, you can create several different types of plotted graphs, choosing the one that most clearly presents your data and rendering it in a variety of colors. These types include polar (a circular, looking-down-from-above graph), three types of logarithmic plots, and the more familiar linear plot. There are six different line patterns available, along with eight symbols to indicate data points and five data-reduction methods. You can also include error bars at the data points to indicate the possible range of values for each point. The 35-page manual includes brief descriptions of the available functions and details on the data-entry format. (Demonstration files included with the program also show off various features and act as examples for your own data files.)

APlot2D uses a type of scripting language that lets you specify every possible graph option for the data file to be plotted. Initial data entry is rather cumbersome, requiring that you follow a specific format with a separate text editor. Once you have the information plotted, however, it is a simple matter to alter individual pieces of data through menus and requesters.

While you can manipulate virtually every aspect of your graph in this way, these are far from standard Amiga requesters. The scientific heritage of the program filters through. For example, the gadget that executes your choice is labeled "Employ," rather than the standard Amiga terminology of "Run" or "Execute."

Output Options

The program presents graphs on a high-resolution interlaced screen for fine detail, so an A3000 or flicker eliminator for the A2000 is in order. Once you've created your graph, hardcopy is produced in one of three ways. You can use the old Workbench standby (GraphicDump) to direct the screen to your printer, or you can save the screen as an IFF file or as a PostScript file. This last option enables you to take the file to a service bureau for output on professional image-setting equipment.

If your graphing needs run only to everyday bar and pie charts, this is not your program. However, if you are doing serious number crunching or data collection and need to present your findings in graph form, APlot2D will probably serve you well.

—Rob Hays ■

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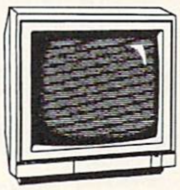
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The Game Preserve

By Peter Olafson, AW Games Editor

Desert Strike

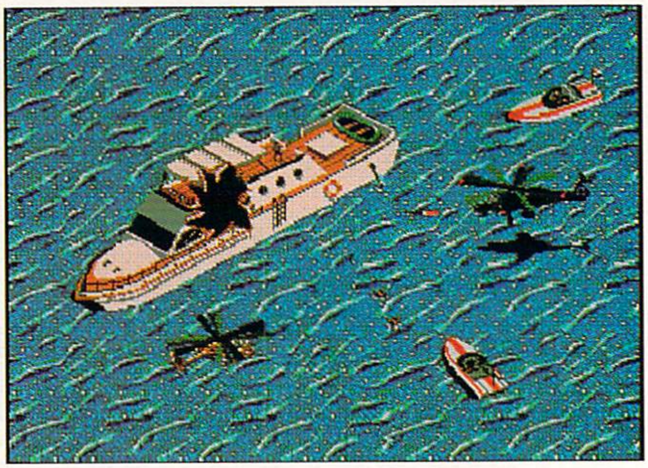
A	1.2/1.3 ✓ 2.0 ✓ 3.0 ✓

Not hard-drive installable.
No copy-protection.

FORGET WHAT YOU may have seen on the Genesis and Super NES. **Desert Strike: Return to the Gulf** (*Electronic Arts*, $49.95) on the Amiga is an experience all its own. This white-knuckle arcader is even more over-the-top than earlier console conversions like John Madden Football and Road Rash. It's the sort of game that should make cart-gamers turn green. And it's one of the best Amiga games ever.

If you haven't seen the console version, so much the better. Essentially, this is Chopperlifter recast as a massive isometric shoot'em-up with a good whiff of strategy mixed in. You direct an Apache attack helicopter against the strongholds of a certain not-so-well-disguised Middle Eastern loon using chain-gun and two types of missiles. Using a winch and ladder, you collect caches of ammo and fuel (some of which have to be, uh, liberated from their respective storage buildings first) and rescue little tan-suited MIAs wandering the desert.

Your wits will have to take you the rest of the way. This isn't a straight-up blaster. The playfield (there are four) isn't just the narrow band familiar from shoot'em-ups, but a wide and varied world—as seen through the bank's security camera—that rewards exploration with things interesting and even useful, stowed in out-of-the-way places. And there's not simply one task per level, but several linked missions. On the opening level, you'll have to take out radar sites, a power station, airfields, and the command centers—and finally rescue the spy whose location you learn only when the command center goes down.



You'll get a bird's-eye view of the enemy in Desert Strike.

Along the way, you'll find jeeps, checkpoints, little guys with rocket launchers, and various annoying buildings. Go ahead. Blow them all up. Virtually everything is combustible if you have the ordnance handy.

Finding your way to the next explosion is simple, too. The joystick controls are responsive, and a set of screens that tell you where everything is, what's onboard, and what's still to be done is a keypress away.

Finally, Desert Strike is just lovably slick: You can tell from the way the option and pilot-selection screens zip in and out of view that you're onto something quite special here. (Isn't it ►

CRIB NOTES By Peter Olafson

Lots of folks are breezing through the first two levels of Shadow of the Beast III (Psygnosis, $59.95)—which aren't all that tough—and immediately getting bogged down in one of three ticklish puzzles on the third.

You can get into the Caves of Bidhur once you've finished either the forest or the fort. It starts much like Level One—with a bang. Head right until you pass two robotic skeletons on a bridge above you, and then jump up and let them have it from behind. (You can also just dodge whatever they're throwing and leave 'em be.) Continue right, and hop onto the branch. Move all the way to the right and jump up the branches to the top. (If you're the nasty sort, you can blast the nest and the birds that you'll find at the top, but it's not necessary.)

There's no room for error here. Carefully head right, then down the ladder—note the caged bird calling for help—and right again, and you'll find a table, a fireball-spitting head, and a blank wall. Timing your moves to the stream of fireworks from the head (it always targets the same spot), shoot off the table's left leg, jump onto the table proper, walk off its right-hand edge, and turn around to shoot off the right leg. Now it's a seesaw. (Be careful not to push the table against the far wall, since you can't move it back again and will have to start this sequence over.)

The seesaw's left end should be under the stone head. Fire at the head from the right. It will fall on the table, rather than shattering, and your teeter-totter will become a catapult. Push the entire assembly all the way to the left, climb the ladder, jump off the ledge onto the seesaw, and the head will smack the cage and free the bird. The grateful critter will now permit itself to be ridden. (Does this bird know the stunt you pulled with the nest?)

Direct it up and to the right until you come to a set of metal balls and ramps (and the biggest statue you've ever seen) on top of the next cliff over. This ensemble is essentially a giant game of Landslide. The balls can be released one at a time by hitting the toggle at the base of the column, and the path down the ramps can be adjusted by hitting the pivoting doorways. ►

A—Wow! Exquisite. A must for your games library.
B—Great fun. Plenty of entertainment value here.
C—Meets expectations. Good, solid, performer.
D—Disappointing. Lots of room for improvement.
F—A real stinker. Don't waste your time.
✻ You may encounter some problems under this operating system and/or require a PAL/NTSC adapter.

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fun sometimes to just sit back and watch the software hit the hardware?) It's been rewritten from the sand up for the Amiga. The 64- and 32-color graphics are much crisper, the explosions are gorgeous (they reportedly each take up 40K in memory), and the little MIAs on the ground now call out "Over here!" and "Help!" in digitized voices. (OK, so they're yelling in British accents—a clue that this is a product of EA's UK division.) The copter sound comes from the Apache itself.

And I can't wrap up without mentioning the wealth of delightful minor detail lavished here: the tiny US flag waving on the beach, the flames from a burning truck, the Lemmings-sized troops waving and running and going down, and the way you don't blow up if you crash for want of fuel.

Just two reprimands for the victorious troops: Couldn't EA find a picture for the title screen that has the Apache flying over sand instead of browned-out trees? It looks more like Return to the 'Burbs.

And unfortunately, like its brother console-to-Amiga conversions, the three-disk Desert Strike doesn't go on hard disk. That may not be much of an issue Over There, but it's bound to cost the game some respect in the US market, where HDs are far more common. We can only hope EA takes this into consideration for the next release in this series—NHL Hockey. I can't wait. I just can't wait.

Caesar

B+ 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓
Hard-drive installable. No copy-protection.

THE ONLY THING really wrong with Sim City (Maxis) was that it didn't go far enough. The city you built was an end in itself. And delightful as that end may have been, there wasn't anything you could do with your creation once it was up and running...except admire it or destroy it (much in the manner of plastic model planes).

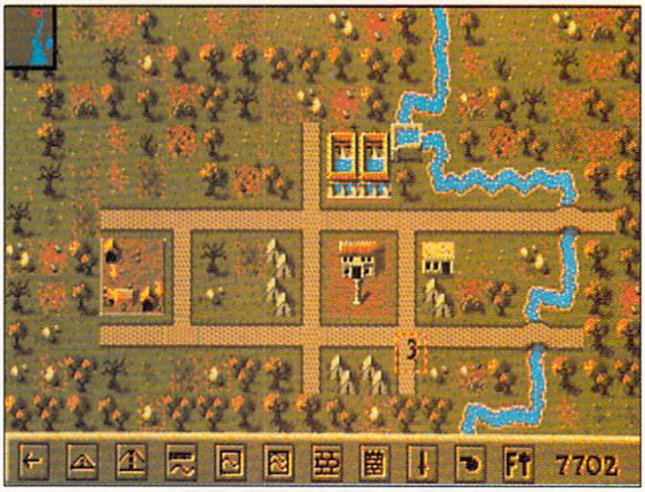
With this in mind, I come to praise **Caesar** (***Impressions***, $59.95), not to bury it. It's a Sim City that goes further: a classical turn on Konami's Utopia that lets you build a provincial Roman capital circa the birth of Christ, develop the region around it, defend both against the depredations of the ever-present barbarians, and address occasional requests from the people and orders from your boss back in Rome.

The system-game is much like Sim City's. Using an angled-down perspective, mouse, and a menu bar (this one at screen-bottom), you select and place buildings (forums, public baths, and prefectures) and elements of infrastructure (walls, roads, and plumbing) on an empty map. It's quite enjoyable. There's much more articulation in the types of buildings you can construct (eight different types of forums and workshops, for instance), with sensible links between their integration and the city's growth, and many offering some small animation to complement the troops and citizens wandering the streets.

And if you want some hard facts to go with the color, it's a breeze to summon information on how you're doing—taxes, distribution of the work force, morale of the troops—by clicking on the various fellows on the Forum screen. (Troubleshooting in times of unrest can be a bit tough, though; the game tells you where the unrest is and how bad, but not the precise source. Perhaps the Forum could have used one more fellow: an advisor.)

At any rate, a full-fledged, self-sustaining city is quite a lively place—it's fun to watch (the view is close-up compared to Sim City, so there's a greater sense of intimacy) and a challenge to create.

And yet Caesar isn't quite full-fleshed. The combat system



Build your own Roman Empire with Caesar.

CRIB NOTES

From p. 78.

There's not much room for exploration in this game. But this is one spot where it'll pay off. Below and to the right of the apparatus, you'll find a set of caverns. At this stage, the top two are impassable—on account, respectively, of a huge block and giant metal rods thrusting up from the ground (this last a decided tip of the hat to the original Beast).

The metal balls are the answer to both these problems. (Again, take your time here, as there are only enough balls to get the job done.) Set up the ramps so that the balls empty into the top cave, and release the first three. (They'll serve as ball bearings to help you move a stone step into place.) Now set them up so the balls go into the next cave down, and release the rest. (They'll block the holes through which the metal rods pop up.)

Once this is done, fly the bird down the shaft to the bottom chamber, move to the lower right-hand corner—where you at least have the benefit of having your back to a wall—and kill the strange turkey-like birds you'll find there. At length, one of them will drop a hammer. Take it and return to the topmost cave.

This passage is a bit tight-going, and your bird friend can't make it through. So dismount, squeeze through the gap, and look lively, man, as you'll almost immediately find a stone slab falling on you. (You can spot it beforehand if you do a little reconnaissance on birdback. Just dart left to avoid it.)

Change your active weapon to the hammer, push one of the three balls you released into this cave over to the left-hand edge of the little pit, and keep hitting the stone slab to move it to the right and onto the metal ball. Every time a ball is freed-up at the rear of the slab, move it in front of the stone. (Try to space the balls so that you only have to move them from back to front after hitting the slab about four times.)

Once the slab's across the pit, hit it a few times to be sure it's gone as far as it'll go. Then change your weapon back to the shuriken, and use the slab as a step up to this level's major-league monster, which can be defeated by jumping over its fire and bashing it in the eye as it retreats. After it's dead be sue to grab the flask from the laboratory to the right.

Back on the bird, you now traverse down to the next cave, where you'll find the metal rods replaced by bobbing metal balls. Get off the bird, select the flask as your active item, and jump into the middle of the grisly red pool you'll find here. Pressing fire fills the flask...and takes us on to Level Four. □

To locate vendors of the games reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 94.

used for the all-too-frequent encounters with barbarians is abstract and simple, with four icons for different offensive tactics and a fifth for retreat. This may have been a side effect of Impressions' plans to release Cohort II—an improved version of Fighting for Rome, which links with Caesar to allow you to fight out the battles in detail. That's encouraging, of course, but I wish they'd found a more sophisticated engine in the meantime. This one feels like a sort of guessing game, and it's out-of-character with the city-builder.

The construction set is pretty clean, though there's the occasional problem when certain pieces—notably reservoirs and pipe ankles—are built too close together. Caesar is also a touch slow on a 68000-based machine, and on a fast one the mouse can be a touch over-sensitive until you get the hang of things. Hence, it's possible to build a whole stretch of pipeline or highway when you only meant to build one or two segments.

Still, what little evil Caesar does will not live after it, and the combat issues should be addressed by the time you read this. This is altogether the best game Impressions has released. Hail Caesar!

The Chaos Engine

A– 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓
Not hard-drive installable.
Copy-protection.

THE CHAOS ENGINE (***Renegade***, about $40) finds the Bitmap Brothers happily back on track. The cutesy-poo platform-game, Magic Pockets—however charming—was something of a minor-key detour from a brilliant run of games that boosted this English design team's name into the pantheon of Amiga gaming: Xenon II, Speedball/Speedball 2, and Gods. Chaos returns to their old strengths and exposes new ones.

It's a land-locked overhead-perspective shooter first, and a grand one at that: a 16-level quest to destroy a machine that has corrupted time and space. (Hence, perhaps, the rather Victorian cast of much of the game.) In the fashion of games like Sega's Crackdown and Alien Syndrome, each level isn't simply a slash of terrain, but a whole region, and your two players will have to find and activate the exit—no small task on the larger levels—before you can escape.

Yes, two players. There's no one-player mode. And ideally, you'll play Chaos Engine with a pal. However, most of us aren't fortunate enough to carry around a spare friend in our hip pockets for such occasions, and will appreciate the computer-



Battle a computer gone haywire in The Chaos Engine.

controlled player. It tends to follow you around like a hungry puppy when you're on the move, but in combat and post-combat it's uncommonly intelligent. (It doesn't simply shoot every monster in sight and hog all the treasure.)

That's the least of it. I remember describing Chaos to someone as an arcade/role-playing game. It's not—it's a sophisticated arcade game—but it makes use of many good ideas imported from RPGs. There are sometimes multiple paths through levels, multiple exits and entrances, and you chose your chaotic duo from among six characters with distinctive attributes and special gifts (like throwing up a map of your surroundings).

Chaos Engine has also inherited the Bitmap family's typically burnished good looks. The graphics have the thick, ruddy lustre of a good shoe shine. The special effects—that is, the effects accompanying the game's "specials"—are sharp as a Ginsu steak knife. Digitized speech and sound abounds.

It's only in detail and on a technical level that The Chaos Engine is occasionally wanting. Passwords that let you resume play later are offered up only after every four-level world. And I'm not enchanted with the floppy-only play and/or the on-disk copy protection on Disc Two. (On a happier note, the European release runs just fine on NTSC machines *sans* PAL-booter. A US release is still sketchy at the moment.)

But what else is new under the British sun? Don't worry, be happy. The Chaos Engine is great. And the Bits are back.

SHORT TAKES By Peter Olafson

Sleepwalker

A 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓
Not hard-drive installable.
Copy-protection.

They say you shouldn't wake a sleepwalker, but what do you do when a sleepwalker wakes you? Sleepwalker from *Ocean UK* (around $40) may do just that. It's an extremely clever arcade/puzzle game casting you—not as the blond boy trudging through this cityscape with arms outstretched—but as the faithful dog determined to keep his master out of harm's way. So while you're doing the usual jumping, running, and beating up baddies, you're doing it on someone else's behalf, and all the while you'll find your mind tethered to that helpless, Lemming-like creature somewhere behind you.

It's challenging right from the get-go, and Ocean's sometimes-generic artwork has rarely looked so gorgeous. And fast? When he builds up a head of steam, this hound's a regular Sonic. (Note: An A1200-specific version exists. Unfortunately, it doesn't do much that the standard version doesn't.)

Wizkid

B+ 1.2/1.3 ✓ 2.0 ✓ 3.0 –
Not hard-drive installable.
Copy-protection.

Meanwhile, *OCEAN USA* has just pumped out Sensible Software's Wizkid ($49.95) —a sequel to the celebrated (in Europe, anyway) Wizball. It's a creative turn on Breakout—the idea being to knock blocks into as many critters as possible and so ob- ►

MORE SHORT TAKES

tain musical notes—that makes great use of the Amiga's ability to move lots of brilliant-colored objects around the screen quickly and smoothly. Hardly another clone, though: It's strikingly original and pleasantly dizzying, in a way small children and large adults are certain to enjoy. And while the game is quite simple at its heart, that very simplicity is a great part of its charm. Nice tutorial and sub-games, too!

THE HUMANS

B — 1.2/1.3 ✓ 2.0 ✓ 3.0 – Not hard-drive installable. Copy-protection.

Another delightful piece borrowed from the Lemmings puzzle. The Humans (*Mirage*, about $40) gives you joystick control over a crew of up to eight dopey-looking cavemen in what looks, at the outset, like a platform-game. These big-eyed ughs walk around. They climb ladders. They climb on each other to make teetering stacks. And here's the new wrinkle: They manipulate and use assorted cavemanic objects—wheels, torches, and whatnot—in their level-escaping cause. (A spear as pole-vaulting equipment?)

That adds a dimension to The Humans that the pre-equipped Lemmings can't touch. It's also one of those pure Amiga creations—loads of sound and graphic fury—that make you proud of our favorite computer. But—and it's a big but—Humans also takes absolutely forever to load, throwing up lord-knows-how-many toney intro screens before you get to the game proper. It also supports only the internal floppy drive (which means a lot of swapping among the three disks), and it's not NTSC-friendly, so you'll need a PAL-booter and a Fat Agnus chip.

Still, try it—it's clever, beautiful, and lots of fun, and Mirage recently released a data disk (The Jurassic Levels). But you may evolve a couple of extra thumbs from all the twiddling while waiting for Humans to load. (Note: Gametek was expected to release a domestic version of Humans, so it's possible some of these problems have been cleared up.)

FIGHTER DUEL PRO FLIGHT RECORDER

B — 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓ Hard-drive installable. No copy-protection.

The newest version of the superb Fighter Duel Pro (*Jaeger Software*, $79.95) features this major upgrade. For the gamer, it's basically a VCR enabling you to record and play back your airborne exploits: a nice, but not critical, addition to an already substantial and singularly smooth flight sim and virtually transparent when in use (though I don't much care for having to reboot to access the resultant tape). It's also the first game-related Amiga product to require 3MB of memory.

I ought to add that Jaeger really intends Flight Recorder for the "serious" user. On the cover sticker, it's described as an "aerodynamic motion path generator"—meaning a tool that (among other things) converts FDP flights into motion files for use with Imagine (Impulse), LightWave 3D (NewTek), and VistaPro (Virtual Reality Laboratories). I can't comment on how well that works, but I'm rather taken with the VCR. Film at 11 o'clock!

SPACE CRUSADE: THE VOYAGE BEYOND

B+ — 1.2/1.3 ✓* 2.0 – 3.0 – Not hard-drive installable. Copy-protection.

Gremlin Graphics adapts the engine it created for its board-game conversion HeroQuest—no relation to the Sierra game—to a futuristic combat game, and does a pretty fair job of it, too.

For one thing, they haven't made the mistake in Space Crusade (around $40) they made with HQ, which had rather too much of the board game still visible in it. I like the mix of overhead (for movement) and angled-down (for action) perspectives. And since this is actually an expanded version of the original release—bringing the game up to a total of 22 missions — there's plenty to be done.

Then again, it's a PAL game, requiring a Fat Agnus and a PAL-booter, and the icons at screen-bottom are almost chopped off on an NTSC monitor even when booted in PAL. Until I memorized them, I was constantly standing up to peer down the monitor's cowl: (Mr. Olafson! Really!)

OMAR SHARIF ON BRIDGE

A– — 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓ Hard-drive installable. No copy-protection.

Here's one bridge I won't be burning. The star of Dr. Zhivago is evidently a demon bridge player, and he's lent his name (and digitized voice) to this splendid Amiga version of the classic four-handed card game (*Interplay*, $49.95). I gotta own up here: I'm at best a novice at this sport, but Omar's dulcet tones ("That was a good play!"), the game's plain-English hints, and easy-to-get-around interface made for a most pleasant hour or two. I didn't feel on the outside looking in.

(Note: The docs report the program requires one meg of chip RAM, and the hard-disk installation program doesn't ask where it should go on multi-partition systems. It defaulted to System2.0: instead of Work: on my A3000.)

THE ANIMATION CLASSICS PACK

B — 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓ Not hard-drive installable. Copy-protection.

A mixed bag of reissues from *ReadySoft*. On one hand, it's nice to see Wrath of the Demon again. It's a Shadow of the Beast-ish action-adventure with a pleasantly high difficulty level, luverly pictures, and many layers of parallax scrolling. Gorgeousness abounds.

Then there are two Don Bluth games: Space Age and Dragon's Lair II: Time Warp. If you were weaned on the arcade CD-ROM originals of SA and DL, but could never come up with the quarters to finish them, go for it. They were brought to the Amiga with a joyful authenticity—it's like playing cartoons—and the graphics, animation, and sound are all peerless. (They all work perfectly on the A1200, too.)

If you weren't...sigh...well, you may probably find the push-in-the-right-direction-at-the-right-time-or-die-big-time aesthetic wanting in variety. And the $69.95 list price is a mite stiff for re-releases.

OIL BARONS

D+ — 1.2/1.3 ✓ 2.0 ✓ 3.0 ✓ Hard-drive installable. No copy-protection.

Remember The Stock Market Game? It was a rather basic, but not an altogether unpleasant, share-trading game designed by StarSoft and put out in 1990 by budget label ComputerEasy. If you had a bunch of people over for a party, it wasn't a bad icebreaker.

MORE SHORT TAKES

Oil Barons (*Lobo Software*, $29.95) is essentially The Stock Market Game: The Next Generation, but it's more of a room-clearer than an ice-breaker: EGA-level artwork, huge waits between screens (especially on a 68000-based system), minimalist animation (like one-pixel running lights winking on and off), and "music" that will intimidate your pets.

Shame of it is, the game underneath seems to be semi-involved by comparison—all sorts of forces are at work here—but who's going to be induced to play it when the presentation is so rough-and-ready? If you have to get an oil-industry game, dredge up a copy of Electronic Zoo's Black Gold instead. Oil Barons is a serf.

LAVANDISS ROLE PLAYING GAME SYSTEM

D–
1.2/1.3 ✓
2.0 ✓
3.0 ✓
Hard-drive installable.
No copy-protection.

Well, let's just say it isn't exactly the Bard's Tale Construction Set. This RPG-making and playing system from *Software Studio* of Canada ($24.95) isn't even Adventure Construction Set. The graphics are crude beyond telling; the flicker over the control icons is irritating—it would be hard to tell what some of them were even without the flicker; the docs are marginal; and it's programmed in BASIC so it's slow as molasses in January. The Lavandiss RPG System would earn an "interesting but flawed" if it were public domain or shareware, but as commercial software...well, let's just say there are cheaper ways to buy blank disks. By the way, who or what is Lavandiss?

THE DIGITAL DUNGEON

B–
1.2/1.3 ✓
2.0 ✓
3.0 –
Hard-drive installable.
No copy-protection.

Not a computer game at all, but a nice gaming aid for tabletop role players—one considerably more advanced than SSI's antique Dungeon Master's Assistant series (the only other commercial offering in this line).

Digital Dungeon (*Magic Matrix*, $69.95) consists of eight disks of D&D-type clip art—terrain, enemies, objects, and mouse-driven machinery to put 'em together in a sort of visual front-end for the RPGer's imagination. By and large, it works well at smoothing over and firming up over the rough edges that invariably accompany "live" RPGs, while being itself easy to use (with some practice) and well-supplied in raw materials. (For instance, there are 88 "entities" in here, and data disks are promised.)

On the other hand, DD has a few rough edges of its own. The artwork is of inconsistent quality, and the program has a number of peculiarities—such as having to invoke the HD install routine once for each of the disks and not saving your system configuration from boot to boot—that reveal this as a first product. (It also doesn't seem to work fully under 3.0.)

But overall, this rolls up as a 13 or 14 on the old 20-sided die. (Keep an eye on this little label, by the way. It appears to have some interesting tricks up its Amigas.) ■

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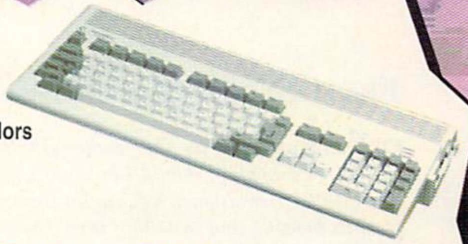
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HELP KEY

Seeing red over CD-ROM or have you got the floppy-drive blues? Tim tackles these and gets your screen out of the black.

By Tim Walsh

From CD To Shining CD

Q. *With the price of the Commodore A570 CD-ROM dropping, should I buy one for my A3000? I envision removing the drive from its housing and installing it into an external case and connecting it to my A3000 via a SCSI port connection. Would my A-Max II board recognize the CD-ROM drive? If I connected an Apple 300i CD-ROM drive to the A-Max II, would the Amiga recognize it in Amiga mode?*

Daniel Hoffmann
Corning, NY

A. Instead of butchering the A570, a far better solution is a low priced Commodore CDTV. You can get Software Distillery's Parnet system (see May '93, p.84) for your A3000 and a CDTV, and you'll have a very versatile CD-ROM player that can also play music CDs in stereo.

Your question concerning A-Max II is a little more involved. I can't duplicate the A3000/A-Max II/CDTV configuration that you describe. Technical support at ReadySoft is currently updating A-Max's code to support various Mac CD-ROM software drivers, but cannot recommend any CD-ROM drives at this time.

Emplant, Utilities Unlimited's Mac emulation board (see p.15), might be the solution. Emplant's documentation claims support for CD-ROMs, hand scanners, and Syquest's drives, but only if they're connected to its SCSI interface and not to the Amiga's SCSI port. Finally, the Amiga will not recognize an Apple CD-ROM drive either, but you could copy data from ISO-9660 formatted Mac CD-ROMs using the aforementioned Parnet and CDTV.

Screen Test Sorrows

Q. *I have an Amiga 2000 equipped with MicroWay's flickerFixer and a Taxan 770 Plus multiscan monitor. I use Preferences to adjust the screen position so that most of the time the display looks fine. When booting the system with a game disk, though, there's a large black band on the right side of the screen. I've tried adjusting the monitor's manual horizontal position settings to no avail.*

Stephen Dunning
APO AE

A. Your monitor and display card combo is sought after for non-video graphics, word processing and the like, but it's hardly the game player's configuration of choice. My old house-bound A2000, equipped with an aging flickerFixer and NEC's Multisync II monitor, bears close resemblance to yours. No one notices the half-inch black border on both the left and right side of the display thanks to its superb hi-res screens and ability to handle a wide range of both interlaced and de-interlaced non-AGA resolutions.

One-time fine-tuning is the key. First tip: Don't bother with the tiny video adjustment screw located on the right side of the flickerFixer; it's incredibly sensitive and will just corrupt the video output. Instead, set your monitor's horizontal position so the screen is centered, and if the monitor has a horizontal size control, set it to the maximum setting.

The next item on the list is the operating system. Your mention of Preferences raised a red flag to Workbench 1.3's limitations. Once again, my advice rings to the tune of AmigaDOS 2.1. With the ROM and system software upgrade installed, you have an overscan setting in Preferences that allows you to "stretch" the screen in eight directions, and then save those settings, in turn making the most of your multiscan monitor's displayable area.

Next on the to-do list is to copy as many of those games onto your hard disk so they'll use the Preferences settings. Naturally, you're going to find that some of the older games must be booted from the floppy. If their graphics-intensive displays are unacceptable with those games, get a workaday Commodore 1084 monitor. Leave your multiscan monitor plugged into the flickerFixer and connect the 1084 to the standard video port on the Amiga. You can then play games just fine with full-screen overscan on the 1084 and use the other monitor for applications.

Salvage Equipment

Q. *Is it possible to connect my Commodore 1541-II disk drive to my A500? Also, can my system's external California Access CA-880 disk drive's 23-pin port be modified to accept the 1541-II?*

N. Wendell Garman
Gilroy, CA

A. There's some good news and some bad news. First, the CA-880's port is for daisy-chaining other Amiga-compatible floppy drives, which does not include your 1541-II. Now for the good news: While most hardware and software emulators from a few years ago offered varying degrees of Commodore 8-bit emulation, programmer Cliff Dugan started a small, enterprising company called QuesTronix (PO Box 340285, Hartford, CT 06134-0285) that offers the best solution—The A64 Package.

QuesTronix offers, as shareware, the many dozens of files that comprise the package and makes them available on nearly all of the major telecommunication networks, usually as two separate archived files. Be sure to contact QuesTronix for its latest pricing and availability, but it was offering a parallel port adapter for the A500, A2000, and A3000 for $39.95, which allowed some models of older Commodore 8-bit drives and printers to be connected to the Amiga. I recall using the adapter and software several years ago on my A3000 and it worked with remarkable consistency. ■

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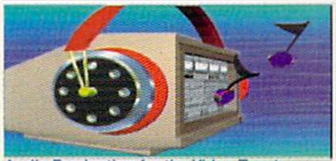
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DevWare ToolChest

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An amazingly powerful program at an unbeatable price, ***OctaMED Pro*** *features:*

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- Includes it's own powerful sampling software to create your own instruments!
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- Learn music note reading (note recognition) in four clefs (Treble, Alto, Tenor and Bass). A timer with three settings can be used to limit time for note identification. Right and wrong answers can be tallied and displayed. • Learn interval shape recognition. This also can be timed and scored activity. • Learn interval ear training. • Learn to identify scales using a graphic representation.
- *Includes bonus feature!* **Music Tutor** allows you to access music terms and identify symbols using its music terms database. Add your own terms to the data base with built-in text processor.

Mozart's Music Master with Music Tutor is easy to use and works with all current Amigas and versions of AmigaDOS. Product code: T4006

Amiga Musicians Floppy Magazine

The Disk Magazine for anyone who has an Amiga and likes music!

If you want to learn more about using the Amiga as a music computer, then AM/FM is for you. Each disk contains news, reviews, previews, hints & tips, tutorials, new sounds for popular synthesizers, lots of great Amiga music, and the latest sound and music utilities! Each issue contains 2-5 Amiga songs, 2-5 MIDI songs and **4-8 Sound/Music Utility programs! The AM/FM Sample disks** are chocked full of superb quality samples from the latest and best in synthesizers, drum machines, etc.

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True BASIC 2.0, Student Edition

Product Code: T2033

"...After years of language and compiler hopping, I am convinced there is only one programming environment...this new release of TrueBASIC for the Amiga *is* that environment." (*Amazing Computing*, Sept. '92)

The most recent release of TrueBASIC, the powerful programming language from Kemeny & Kurtz, the original creators of BASIC. You will receive the Language, libraries for font support, DO files, script files, more than 30 demo programs, and a 200+ page manual. **System requirements:** Any Amiga with one meg of memory.

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- you can run TrueBASIC programs of *any* size
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Get any 2 math programs	T2036	$26.95
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Get all 8 *Plus* TrueBASIC 2.0	T2063	$109.95

MegaTest $29.95

Attention Parents! Teachers!

Available exclusively from DevWare

This hypertext-like **TEST** and **TUTORIAL AUTHORING PROGRAM** is extremely versatile and can create test designs that integrate sounds, pictures and text into any question. Multiple choice tests can be quickly created with up to five possible answers.

Features

Picture, IFF sound and a separate text file can be keyed to any question. When picture or sound is keyed to a question, appropriate button lights up alerting user. Test Mode and Tutorial Mode. Score: number of questions missed and correct is tallied and displayed on the screen each time a question is answered. Will give customized sound feedback indicating a correct or wrong choice. Easy-to-use test maker is a separate program from the testing software. Several sample tests included. Easy-to-use mouse interface. Supports all current AmigaDOS versions.

Megatest is already being used for studying for college exams, making tests to teach music to children in the home, using it as a test to identify bird calls, and more! An incredible value! T4004

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RK2: MachIII - This remarkable utility will allow you to record any mouse click or keypress and play it back as a macro at any time, inside any program. Also provides memory info/clock, alarm, screen blanker, mouse accelerator, mouse-to-menu and window cycling. $19.95.

RK3: 3D Objects an amazing collection of some of the best 3D objects we've ever seen in Imagine format. Running man, spaceships, staircase, hoverboats & much more. Also texture maps to wrap around some of the objects...1.5MB of data in all! $14.95

RK4: Home Manager This program will help you keep track of your life! Complete address book, appointment scheduler, notepad, auto-dialer (requires modem), area-code utility and complete inventory of all your possessions and credit cards. Extremely useful. Requires 1 Meg. $14.95

RK5: Diffusion an Alien terrorists plants a Nuclear Time bomb and you are the only chance of saving the world! Outstanding graphics and sounds complete the mood of this futuristic race against time and devastation! $14.95.

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We have been the official Public Domain Library of all the best Amiga magazines. Find out why these magazines choose us! The first two letters on each disk indicate the orientation of the disk; WB# general interest - most programs can be run from the workbench, FD# games and entertainment, VO# are video related programs/utilities and DD# advanced--requires thorough knowledge of AmigaDOS/CLI. *Thanks to our extensive arsenal of anti-virus software, ALL of our software is guaranteed virus free!*

BEST SELLER!

DD79abcd: Amiga "C" Tutorial - This is the most comprehensive C language--*Amiga oriented*--set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples for Amiga programming. 4 disk set, counts as 3.

NEW DISKS

FD88: AmyBoulderdash - a clone of the original classic.. extremely well done complete with level editor, 2 complete sets of levels and a level editor. Requires Workbench 2+.
FD87: OXYD- A commercial quality game--similar to Marble Madness in nany ways, but allows two computers to link & play together...see how many of the 200 landscapes you can complete without having to get the hint book!
FD86: UChess: The strongest playing Chess program available for the Amiga period. Req. 68030+, Workbench2+, 4MB RAM or more. Supports AGA (req. 8MB!)
WB130: ToolManger 2 - The ultimate tool manager for your Workbench. Add animated icons, sound effects and 'docks' of programs to your WB..very useful! Req. 2.0+ and hard drive.
WB129: Super Virus Killer - From Safe Hex Int'l, who catalogs and kills Amiga Viruses *worldwide*--a complete virus system that knows all Amiga viruses...updated often. Req. WB 2+
WB128: ColorFonts - contains 12 color bitmap fonts for use with DPaint or any software that supports ColorFonts.
WB127: Blankers - Over 20 different screen blankers. Most run on Workbench 1.3+...a few require 2.0+
WB126: EdPlayer - music MOD player that looks, acts and plays like your CD player...AmigaWorld's #1 MOD utility. Plus MOD songs.
DD92: Developer Contains the official Commodore developers kits for the AmigaGuide and Commodore Install Utilities...a must have for all serious developers.
DD91: ParBench - Allows you to easily connect/network two Amigas/CDTVs together and share storage devices. Req's custom cable (docs to make cable included--easy).
DD90: Advanced Utilities - CompressDisk doubles the capacity of your hard-drive on the fly with compression!!! Also contains: disk optimizer, SCSI mount utility, Keymap editors, Enforcer, Undeleter & more. Most programs require 2.0+.

FUN DISKS

FD6: GAMES! - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
FD7: Pacman - This disk contains several pacman type games including; PacMan87, MazeMan and Zonix.
FD10: HackLite - A dungeon adventure game. Considered a must-have classic. This is the 2nd release of this game. Great graphic interface. Play time several weeks!
FD11: Las Vegas and Card Games - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
FD12A,FD12B: Star Trek, The Game - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
FD13: Board Games - contains Monopoly, Dominoes, Paranoids, and others.
FD14: Dungeon Master Hints and Arcade Games - DM maps, spells, item location, and hints and more, also on this disk, Hball - an arkanoid/breakout type game, Trix - a Qix type clone.

DD83: IBM - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software *with* Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatible drives.

FD17: Educational Games - This disk includes several games for youngsters including geography, math, science, and word games, also includes Wheel of Fortune.
FD20: Tactical Games - MechForce; A game that simulates combat between two or more giant robots. Simple words can't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim.
FD27: Arcade Games - This disk is loaded with some great games. Includes, Raceorama a great racing car game with ten different courses, MiniBlast a helicopter gunship type clone, Shark in the same class as frogger, and SBreakout the original breakout with more.
FD31: Games! - Air Traffic Control - a good ATC simulation, Black Jack Lab - a full featured set of card games, ChessTel - play chess with your friend in distant and remote places with this game and a modem, labyrinth - a well done text adventure game (like an infocom game), and MouseTrap - a 3d maze game.
FD32: Flight Simulator - An instrument simulator for a DC10.
FD33: Arcade Games - Ffreddy a Mario Brothers type of game, Gerbils a target practice game, PipeLine a German interpretation of Pipe Dreams, Tron a light cycles version, and Wetroids a wonderful version of asteroids with a hilarious twist.
FD35: Omega (v 1.3) - An outstanding dungeon and outdoors adventure game in a similar vein as hack, rouge, and moria. This version is considerably faster and better that all previous versions. Play time: weeks.

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FD38: Games - Cribbage Master - A great cribbage game and tutor, Spades - a well done card came, ChineseCheckers - A computer version of this classic, Puzz - a slide piece puzzle game and construction set.

WB105AB: Workbench 2+ Extras #2

This set contains the programs that should have been included with WB2+. These powerful utilities take full advantage of the many new capabilities that are available in Workbench 2+. Includes: Tool Manager - a wonderful utility to add programs to your TOOL menu, Virus Protection - Degrader, Icon - Enhances Workbench's "Show All" to display over 40 distinct icons for different types of files. Bitmap Font Editor, Screen Blankers - ala fractals and spliners and swarming bees! Requester Enhancers and CPUBlit. Two disk set, counts as two.

FD39A&B: Star Trek, The New Generation - This is a completely different version of Star Trek than that found on FD12. This one was created by the German author Tobias. Excellent!!! Counts as two disks. Requires 512k
FD50: Submarine Game - Sealance, one and a half years in the making, this is an outstanding submarine tactical game. Commercial quality, highly recommended.
FD57: Arcade Games - Includes 2 truly commercial quality games. MegaBall, an Arkanoid-ish game, features 5 musical scores and addicting gameplay. Gravity Attack is a psychadelic trip through several different worlds—each different.
FD59: Game Potpourri - Xenon III is an almost exact clone of the commercial game of the same name...a great shootemup. Crossword will take lists of words & automatically generate word-search puzzles for any Epson compatible printer.
FD60: Games - In Nebula, race over a 3d world to destroy enemy installations. Interferon; a *great* Dr. Mario clone. Enigma; is it a game or puzzle?
FD61: Games - Solitaire; great graphics, plays two versions. Klide; an interesting piece of eye candy. Extreme Violence; 2 player kill or be killed game. YATC; A Tetris clone with Artifical Intelligence. Genesis; create realistic 3d fractal worlds.
FD62: PomPom Gunner. An extremely smooth and well done World War II gunner simulation. Requires 1 megabyte of memory.
FD64: Games - Wizzy's Quest - a "great" 50 level game with great graphics, Cubus - a 3-dimensional Tetris type game (rotate and move in 3 dimensions). Husker Du - Colors and pattern rather than shape in this Tetris-esque game; 5 screens and 3 levels of difficulty. Requires Fat Agnus (1 Meg of Chip)
FD67: Arcade - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!
FD69: MindGames - Had enough of shoot-em up games? Relax and let these 21 games exercise your mind instead of your wrist.
FD73: Arcade Series - Intruder Alert! is a MULTI-level "Berserk" clone. Features smooth gameplay, great graphics & digitized sound f/x.
FD74: Arcade Series - RingWar is an "Outer Limits" clone with vectorized graphics. MotherLode is a "Lode Runner" clone with 50 levels! In BlitzTanks, they're coming at you from all directions!! Call in air strikes and use your heavy artillery to survive!
FD75: Arcade Series - Descender is a clone of the classic arcade game "Tempest"; complete with vectorized graphics. Tanx is the classic battle of trajectories and inertia between two tanks—incredibly well done! Search is a maze game unlike any other—included is a level editor too. (Tanx requires 1 meg chip memory=Fat Agnus)
FD77: Arcade Series - Galaga'92 is a clone of the arcade game with several gameplay enhancements--with smooooth, sharp graphics, it's better than the original! Pharaohs Curse is a clone of the original C64 classic. Diplomacy is a beautifully computerized version of the Avalon Hill board game--conquer or be conquered!

THE AMIGAWORLD "BEST-OF" SET!

FD85ABCD: AmigaWorld's Best - These four disks contain the *hottest* p/d games of '92! Includes Mother Lode, Moria, Minefield, Poing, Intruder Alert, Deluxe PacMan, Rocky and Super Artillery (see Dec. '92 AmigaWorld) Four disk set, counts as three.

FD81: SuperGames - Some of *the* best games--Donkey Kong is better than the original *with an extra level!* Frantic Freddie and TrailBlazer are both fast-paced arcade games. Mad Bomber is the classic game of "Kaboom" redone with an Amiga flare. All of these games are excellent!
FD82: Intrepid - In the Arctic ice, you control a tank on a mission to rescue hostages in this superbly crafted Amiga original.
FD84: Games! Deluxe PacMan is better than the original--20+ mazes, special "power-ups" with *oustanding* graphics. ThinkAmania is the classic game of concentration--with *beautifully* drawn HiRes images.

WORKBENCH DISKS

WB4:Telecommunication - This disk contains several excellent pd communication programs: Access 1.42, Comm 1.34 & Handshake 2.12a. See also WB102 & WB115.
WB5: Fonts #1- 35 bitmap fonts. Also included are five PageStream fonts,and ShowFont - a font display program.
WB6: Fonts #2 - ShowFont allows you to quickly and painlessly view all 256 characters in a typical font. Includes large AmigaDos system fonts (many up to 56pts).
WB7: Clip Art - This disk is loaded with black and white clip art. Art includes, trees, watches, tools, US and State maps, and more.
WB9: Icons - Truly a multitude of various types and kinds. Also includes IconMiester, IconLab, and others great utilities to help generate icons.
WB10: Virus Killers - The best: VirusX(4.0), Kv(2.1), and ZeroVirus III.
WB12: Disk Utilities - This great disk is loaded with wonderful utilities for everything including making disk labels, disk cataloging, disk optimizing, disk and file recovery archive and organizing, and all sorts of file manipulation. A must have!
WB13AB: Printer Drivers and Generator - over 70 different drivers (including HP LaserJet 3 & 4!), also includes a printer-driver generator. Two disk set counts as two.
WB15: Business - This disk contains a spreadsheet, a database, a project/time management program and financial analysis (stocks).
WB18: Word/Text Processors - This disk contains the best editors. Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a great programmers editor with strong macro features,TexED(v2.8) an enhanced Emacs type editor, and a spell checker.
WB22: Fonts #3 - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
WB23: Graphics and Plotting - Plot, a 3-D mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map IFF image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere.
WB25:Educational - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
WB27: Nagel - 26 Patrick Nagel pictures of beautiful women.
WB29: Graphics and Sound - This disk has several different Mandelbrot type programs producing stunning graphics. Includes, MandelMountains - a realistic terrain generator, Fracgen - generate recursive fractals from user input, Mandelbrot and Tmandel - two fast mandelbrot generators, also Mostra - the best IFF display program to date. Sound - a great IFF sound player, will play anything.
WB33:Circuit Board Design - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.
WB35: 3D Graphics - This disk contains 3Fonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves pallet, World3d - a demo of a front end for use with DKBRender.
WB36: Graphics - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically similar to a rose, SimGen - display those spectacular images as part of your workbench, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
WB37: Educational - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
WB38: Plotting and Graphics - Plotxy is a powerful full featured plotting package. Used by many colleges and universities. Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
WB41: Music - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20--compatible with WB2+.
WB43: Business - This disk contains AnalytiCalc - probably the most powerful spreadsheet program on the Amiga. A full featured spreadsheet with many features expected in a commercial package. Req. 1.2 MB

SPECIAL PRODUCT!

QT1: THE A64 PACKAGE - A very complete Commodore 64 emulator. Supports any CPU and is fully compatible with WB1.3 & 2.0. This version includes a special adaptor that will allow you to connect your 64's 1541 disk drive to your parallel port of your Amiga for total emulation. Two disk set, counts as two. Special price $49.95 - including hardware.

WB46: Clip Art - HighRes clip art with the following motifs - embellishments (borders, dodads ,...), people, & transportation.
WB47: Clip Art - Hires clip art. Motifs - hair, drafting, summer, animals and macfood.
WB48: Clip Art - Hires clip art. Motifs - Holidays, music, medical, and misc.
WB50: Animation - Seven of the best euro-style animations or "Demos", including - scientific 451, subway, sunride, thrstdemo, tnight, waves, and woow.
WB53: Graphics - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings..., and surreal images. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
WB54: Printing - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio -a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and more.
WB55: Application - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Houser M.D", Cal - a calendar program, Magman - a database tailored for articles and publications.
WB57: Animation - This disk has several "Demo" style animations, Including, Blitter, Lolly, Sun5, vertigo, vortex, and xenomorph.
WB62: Midi Utilities - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
WB63: Disk Utilities #3 - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, disk track recovery, and forced disk validation of corrupt disks.
WB66: Icons #2- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.
WB69: Music - 90 minutes of classical and modern electronic music for you Amiga.
WB75: Music - over 100 instruments files (.inst) and sample sound files (.ss)
WB79: Home & Business Accounting - Includes Ckbacct - the most complete checkbook accounting program going, LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse, Mileage master - monitor your automobile mileage with this mileage log, Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.

WB119ABCDE: Font Set This collection contains over 100 typefaces for use with Professional Page/PageSetter 3+ or PageStream 2.1+. These fonts will output to any laser printer or dot-matrix printer with no jaggies, thanks to outline fonts. Very pro-looking. *5 disk set, counts as 4.*

WB81: Great Applications - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.
WB82: Animations - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, & Mechanix. 2 disks, counts as 1.
WB93: Workbench 1.3 Extras #2 Contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a gurubuster)and PrintStudio.
WB95: Checkbook Accountant 2.1 - Definitely commercial grade; we've seen many checkbook programs and this is the best. Full budgeting, transaction recording & report generation.
WB96: Dupers - Contains XcopyIII & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
WB99: Lifestyles - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design with instant feedback.

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WB102: Telecommunications - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it can create a full-featured BBS system.
WB106: Home Manager - This is a great all-in-one address book with an autodialer/notepad/to-do list/appointment scheduler/home inventory database and phone number dialer.
WB108: OctaMED - This breakthrough program doubles your Amiga's sound capabilities from 4 channels to an ear-popping 8 channels! All the renound editing capabilities of MED plus 4 more channels! If you thought your Amiga sounded good before...you aint heard nuthin' yet!
WB109: VerseWise - Display, search and print The New Testament.
WB113: Sid II - Why pay 40 bucks for a directory utility, when this one will do it all plus much more! A truly professional-caliber program. Sid 1 was our best, now *completely* rewritten, Sid 2 will astound you.
WB114: Fonts #4 - Contains 36 bitmap system fonts.
WB115: Telecommunication - If you have AmigaDOS 2.04+ and a modem, then this is *THE* program for you. Term *totally* conforms to the User Interface Style Guide for 2.04, has an ARexx port, and supports all popular file-transfer protocols through XPR libraries. We wish all programs were this good.
WB116: Databases - This is what you've been waiting for! Contains 5 uniquely specialized database programs for tracking: Videotapes, CD's, Magazine Articles, Comic Books and Trading Cards!
WB120: Grinder - a complete graphics conversion package that supports GIF's, JPeg, Neochrome, Degas, PCX, Targa, TIFF, HAM-E and IFF format pictures. An invaluable tool for all desktop-videographers and desktop publishers.

WB118: Amiga Beginner - *You asked for it!* A complete tutorial for the beginner on using the Amiga. Starts you off at the power-switch and takes you through to the CLI/Shell and all points in between. *Bonus!* Also included are 16-color icons to replace *every* icon in your 2.0+ Workbench.

WB121: ProPage3 Enhancer - This disk contains over 40 "Genies" for use with ProPage 3.0, including useful ones like Make Pie Chart and Resize Text to fit Box to name a few. Also includes structured & bitmap clipart for unique borders...a *must have* for all PPage 3 users.
WB122: System Optimizer - KCommodity enhances your system, gives memory meters, mouse/keyboard enhancements, online timers plus *many* others...too numerous to list! REorg will optimize hard and floppy-disks for a big speed increase. HDMem will allow you to use up to 2 megs of hard-drive space for virtual memory! (Req. 68020+ w/MMU) All programs require 2.0+.
WB123AB: Flags of the World - same as WB124, but for Workbench 1.3. Req. 1MB. 2 disk set, counts as two.
WB124: Flags of the World - Two modes: click and learn or a game to test your knowledge. Great graphics--fantastic learning tool. Has current Russia & Yugoslavia republics. Req. Workbench 2.0+ & 1MB RAM.

DEV DISKS

DD54: Compression - This disk is loaded with all of the best file compression programs and aids for the Amiga. Many of the programs can be used by the new user. Includes Arc, Lharc, Lhwarp, Pkax, PowerPacker a must have by all, Zip, Warp, and Zoo.
DD71AB: C Compiler - This disk contains DICE, Matthew Dillon's full featured, powerful C compiler & environment. 2 disks, counts as 2.
DD86: The Programmer - Includes GadTools and REQTools which will allow you to create your user interfaces and then the program will automatically generate "C" source code or Assembly-code. Requires, and writes code for, AmigaDOS2+.
DD89: UEdit - Probably *the* most powerful text editor ever written for the Amiga. Previously commercial, now public domain. Req. 1 MB.

VIDEO DISKS

VO5: Modeling - This demo, Vertex, allows you to create 3-D objects without using the abstract X, Y and Z views. Loads Sculpt-3D/4D, Turbo Silver, Imagine, LightWave, GEO and Wavefront formats. MagicTween will metamorphasize any two pics and animate the "in-between" frames.
VO6: 3D Objects - Contains 20 objects all in Imagine format. Includes a complete Amiga 3000, space station and much more!
VO8: CompuGraphic Fonts- Contains 2 Clipart-style fonts and 4 actual typefaces for use with WB2+ and its Fountain utility. Great for Desktop publishing or titling.
VO10: Imagine Enhancer- ICoons and ISL supplement the object and scene editors.
VO11: Imagine Enhancer - T3D converts Imagine objects to OFF, NFF, VORT, Rayshade, MIF, DXF and POV formats.

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UTI 127 - 1200/4000 Utils, Rend 1.05, Viewtek 1.04a, Manipulate and view .jpeg, .gif,.iff etc.. AGA compatible!
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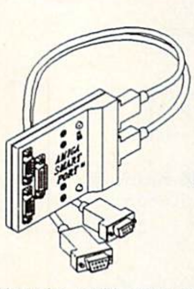
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THE LAST WORD

Kudos, complaints, comments, concerns, and contributions from our readers.

Amiga At Work

Only the most wooly-minded Amigan could fail to realize that our beloved machine is under serious threat. *AW* does a great job month after month in showing its capabilities and how to realize them. (And—a big plus for this reader—you do it in an adult way, without glitzy presentation.) But you could do more. What I would like to see is a new department in the mag—perhaps called Amiga Pro—in which you give pithy case histories of the Amiga at work in the engine-rooms of society: industry, science, design and control engineering, the arts, education, public services. That's the kind of thing that will grab the eyes of both corporate and individual buyers of new technology.

Derek O'Reilly
London, England

Monitor Madness

When I bought my A4000 last week I asked the salesman about the best type of monitor for my new investment. I soon felt like Captain Kirk on a hostile planet without my universal translator. I was standing there with my head nodding in ignorant acknowledgement as he described all the screen options. I decided to do some research before selling my 1084S for a new monitor. My head was still spinning when I got my June issue of *AmigaWorld*. Sheldon Leemon, I thank you! Your two great articles fixed my universal translator and stopped my head from spinning.

Thomas Healy
Lake Oswego, OR

Review of Reviews

Your magazine does have articles about very important and interesting issues, but simply not enough. More detailed information and longer standard reviews of new products would greatly enhance and improve *AmigaWorld*. I would like to see more standardized reviews for both hardware and software, such as a star system or a scale from 1 to 10 or 1 to 5, which would be graded by your writers according to their opinions. This would allow readers to make a more informed decision—from a standardized table of grades that would accompany each product's review—without forcing them to read between the lines of your articles.

Ishay Raven
Sherman Oaks, CA

I soon felt like Captain Kirk on a hostile planet without my universal translator.

Game Plan

Why did you cut the "Game Preserve" by 25%? I'm an avid game player and I depend entirely upon your magazine for coverage. I think that you are catering to a minority of Amiga owners in the video production field at the expense of everyone else. I personally know three other Amiga owners and they bought their machines to play games and run simulations.

Charles Shampine
Carthage, NY

Along with video usage, games/entertainment is one of the highest-rated applications among ***AmigaWorld*** *readers. We don't take this statistic lightly, and, given the recent decline in game development, feel that our current coverage of this market is justified.* ***AmigaWorld*** *will continue to publish its monthly column on games, as well as its annual games issue. I appreciate your support of the magazine and your comments concerning the editorial content of* ***AmigaWorld****, and welcome the input of enthusiastic readers who help ensure that* ***AW*** *is addressing the needs of its audience.*

Dennis Brisson
Editor-in-Chief

Given The Rub

The Amiga has evolved and specialized—for better or worse—into a few niches, most of which I have no interest in. I do mostly data analysis, financial and scientific projects. The Amiga has gone video and graphics and so I suppose *AmigaWorld* must follow, but I'm collecting too many issues featuring reviews, comparisons, and how-tos of fifty products I can neither use nor, in many cases afford.

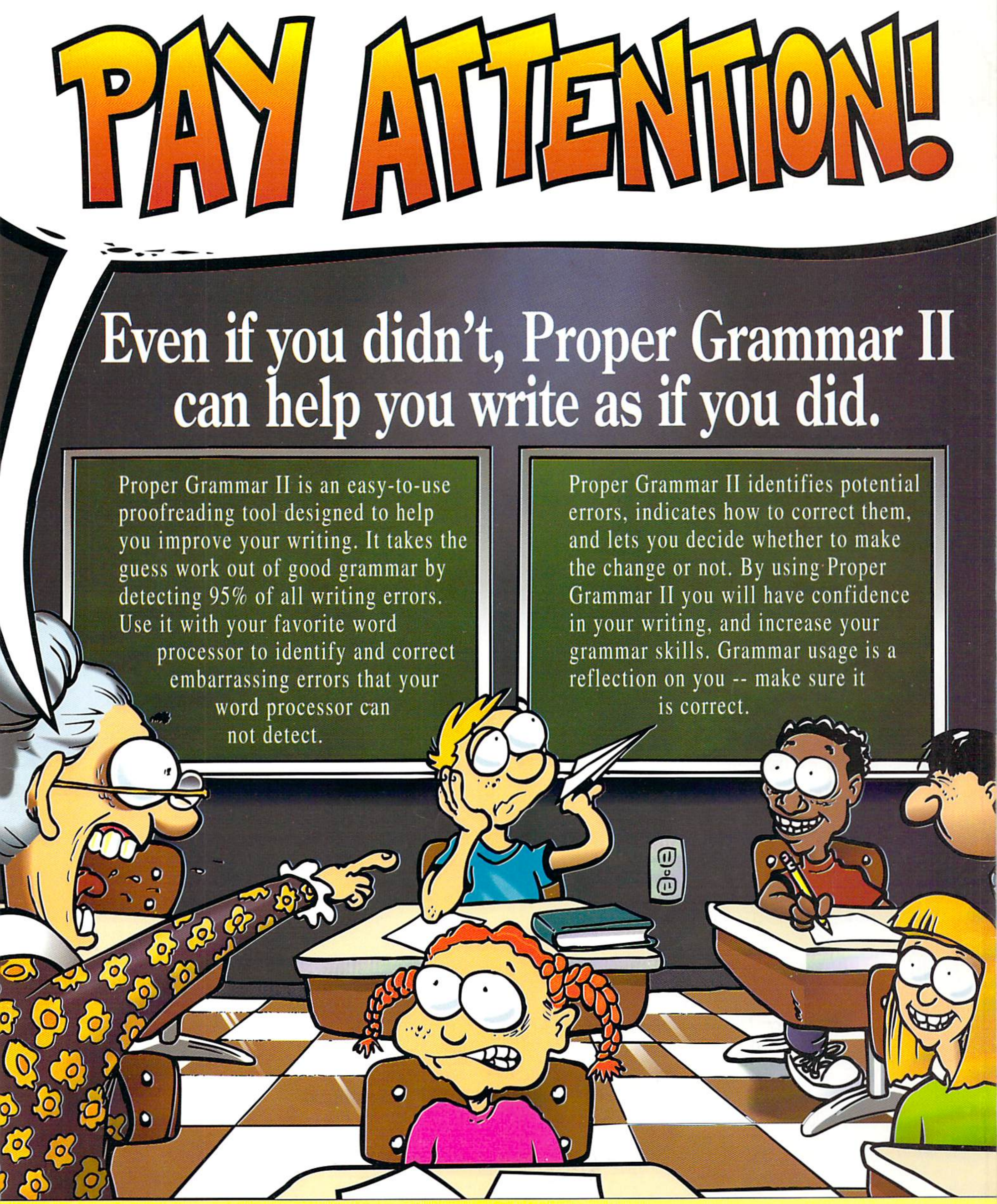
Dave Ceponis
Berkeley, CA

Share More Shareware

I would like to suggest more coverage of public-domain and shareware software. Tim Walsh's "On-Line Scan" is nice, but it needs to be two or three pages, not a half-page box. There are many fine programs that Amiga users may not realize even exist. Please consider expanding "On-Line Scan" into something wider in scope and more in depth than a couple of new files on the big pay systems. I feel that there is a lot of potential there that is being bottled up.

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Got any great ideas? Put it in writing and send it to The Last Word, c/o ***AmigaWorld****, 80 Elm St., Peterborough, NH 03458.* ■


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